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EXTRACTS

GATHERED FROM

PHYSIOLOGICAL AND CLINICAL OBSERVATIONS

CONCERNING THE

MINERAL WATERS

OF VALS (ARDÈCHE)

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VALENCE.

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CONCERNING THE

MINERAL WATERS OF VALS

(ARDÈCHE)

BY DR CLERMONT (OF LYONS)

Consulting physician at Vals

Δεῖ δὲ καὶ τῶν ὑδάτων ἐνθυμέεσθαι τὰς
δυνάμεις· ὥσπερ γὰρ ἐν τῷ στόματι
διαφέρουσι καὶ ἐν τῷ σταθμῷ, οὕτω καὶ ἡ
δύναμις διαφέρει πολὺ ἐκάστου.

It is necessary also to know the qualities of
waters, which, if they differ in their flavour,
and weight, differ no less in their properties.
(HIPPOCRATES, *On the air, water, etc.*)

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INTRODUCTION

When a mineral waters can be preserved for a long time, and transported to long distances without alteration, it is only right that they should be used in places hundreds of miles from their source, especially when the result is the same as if applied at the thermal station.

The proof of the waters of Vals has not to be made. From the cases of bottles which have been transported by hundreds to California and the Antilles, etc., the proofs which have been given leave no doubt as to inalterability of the waters of Vals.

We know well that all mineral waters do not possess the same aptitude of conservation, and that they alter more or less quickly either from the quantity of air which remains in the bottle, the heat, the light, or the agitation which they undergo during their voyage. But if we obtain the waters of Vals from 14° to 16° centigrades, we shall not find in them the lasses of salt which accompany the immediate and unavoidable cooling of mineral waters.

Those who are acquainted with the anti-septic properties of carbonic acid easily explain why the carbonic of soda gaseous waters of Vals can be preserved. The little volume of air between the liquid and the cork is soon invaded, then neutralised in its altering effects by the carbonic gas, the anti-

putrid qualities of which have a reaction on the water which contains it in so great a proportion.

We can still mention amongst the advantages of the mineral waters, when transported, their being of service to the patient at all times, principally with the diathesie ; in this case the treatment ought to be slow and the remedy taken in small doses. They are also for the same reason of the greatest use when we wish to oppose a relapse.

At last, there is still a consideration of great importance. The watering season really lasts but three months, from the first of June to the end of August. It may commence a few days sooner and extend a few days longer, but it is always with risk and peril. In the month of may the temperature is very changeable, and during september the rains are frequent, and often cold, penetrating and of long duration. The almost southern position of Vals does not exempt it from the climatical accidents which occur in mountainous countries. When it rains it is as dull to live there as in any other part of the country.

The dampness which invades it on all sides makes the patients neglect their treatment or only follow it very insufficiently. If, peradventure, the rain increases, you find the patients quickly preparing to leave. They are discontent in themselves and ready to accuse the doctors with the insuccess of their attempts. During many years, we have sent, in all directions, a great number of patients to mineral waters. To mount Dore, generally from the first of July to the 15th of August. In other places from the first of June to the first of September. Beyond those dates we have witnessed patients return in a worse state and full of discouragement. We still remain sceptical as to spending the winter at the mineral watering places, and *advertissements* only prove its success as far as we have been able to observe.

The affections even chronical, cannot be adjourned for several months without great risk to the patients. Nothing is more rational than the treatment by mineral waters transpor-

ted, if, as the waters of Vals, they have the felicitous propriety of being preserved indefinitely, without losing their medical virtues.

From what we have just said, in all sincerity of heart, it would be wrong to think that there is no benefit to be derived from being at the springs of these waters, there are, on the contrary, great advantages.



THE ALCALINE GAZEIOUS WATERS OF VALS.

CHAPTER I.

PHYSICAL AND CHEMICAL PROPERTIES OF THE WATERS.

THEIR ORIGIN. — THEIR MODE OF MINERALISATION.

DESCRIPTION OF THE PRINCIPAL SPRINGS.

The bi-carbonate of soda waters, the history of which we begin in this chapter, are to be found in a circumference of about half a mile, in the beginning or very near to a picturesque and lovely valley.

Notwithstanding the small distance in which they emerge from each other, the differences they present are sufficiently notable, with reference to their quantity and the composition of their mineral elements: It is therefore indispensable to study them separately, and to distinguish the principal differences, if they would be employed with discernment and result in the treatment of sickness.

Hippocrates, in his treaty of the *air*, the *earth*, and the *water*, says, at first: if there is a difference in their weight and their flavour, a difference must undoubtedly be in their properties. How judicious is this remark; it was written in a century in which chemical knowledge did not allow to confirm what induction presented. This induction is sufficient to reveal the powerful genius of observation of him whom we are pleased to call the Father of medicine. If this remark is applicable to ordinary waters in general, how much more to those which are naturally mineral;

because in medical hydrology it is not only the weight or the degree of the saline saturation of the waters which we are to take into consideration, it is also the chemical nature of the elements of which they are composed. From the number of analysis which have been made on the waters of Vals by very able chemists and particularly by MM. O Henry and Dorvault, it results that if we exclude their characteristic medicinal element, bi-carbonate of soda, the carbonic acid which they possess very strongly, is sufficient in itself to give them very important medico-physiological properties. The bi-carbonate of iron united to magnesia enters into their composition in very useful quantities in some of them and in insignificant proportions in others. The chloride of sodium and the bi-carbonate of magnesia form part of the waters of three or four springs and give them qualities to which we shall have to refer later. Finally the water of the spring (*Saint-Jean*) shows, by analysis, very sensible traces of arseniate of soda. We still find in the carbonic of-soda springs of Vals, several neutral-salts (sulfate of soda, carbonate of lime, etc.); but their presence (being only in small quantities), does not sufficiently modify the therapeutic properties of the waters. Therefore we will not treat this subject in great detail.

If the reader wishes to acquaint himself at length, he will find the names of these substances and the doses of each of the springs in a table on the opposite page.

The alkaline waters of Vals are clear, limpid, sparkling for the most part, of an agreeable taste and a little piquant. They have also a strong alkaline flavour, nearly salty, the result of the presence of carbonic acid.

The temperature, which varies from 13° to 16° centigrades according to the springs, always remains the same in each of them.

The average of their solid principles varies from 2 grammes 57 (*la Saint-Jean*) to 9 grammes 24 (*Magdeleine*) passing by all the intermediate degrees.

When we view these numerous fountains of mineral waters, the mind becomes occupied with different questions and instinctively demands from what mysterious cryptes, elaborated by nature, these sources of life and health com from. — By what unknown process is their mineralisation formed? — Are they identical? — And what are their differences?

Table showing the results obtained by analysis made in the laboratory of the Academy of medicine, by OSSIAN HENRI, on the samples sent to Paris. — The following compositions are based on 1000 grammes of liquid.

SUBSTANCES CONTAINED IN THE WATERS		SAINT-JEAN	PRÉCIEUSE	DÉSIRÉE	RIGOLETTE	MAGDELEINE
Thermality invariable at the spring.....		43°	45°	46°	46°	45°
Carbonic acid uncombined.....		0 4250	2 218	2 145	2 095	2 050
Bi-carbonate of lime..... of magnesia..... of soda..... of polash..... of lithine..... protoxide of iron with traces of magn. arsenate of soda..... Alcaline ioduret..... Chloride of sodium and potassium.. Sul- fate { of soda..... of lime..... Alumine..... Organic matter	of lime.....	0 3100	0 630	0 571	0 259	0 520
	of magnesia.....	0 1200	0 750	0 900	0 259	0 672
	of soda.....	4 4800	5 940	6 040	5 800	7 280
	of polash.....	0 0400	0 230	0 263	0 265	0 255
	of lithine.....	indice	traces	not dosed	traces	traces
	protoxide of iron with traces of magn.	0 0060	0 040	0 010	0 024	0 029
	arsenate of soda.....	very sensible	traces	sensible	sensible	sensible
	Alcaline ioduret.....	indice	indice	sensible	sensible	sensible
	Chloride of sodium and potassium..	0 0600	1 080	1 100	1 200	0 016
	Sul- fate { of soda.....	0 0540	0 185	0 200	0 220	0 253
	of lime.....	0 0700	0 060	0 058	0 060	0 097
	Alumine.....	0 0110	little	traces	traces	little
	Organic matter	not determin				
		2 576	8 885	9 142	7 826	9 248

1° SEDATIVE WATERS : *St-Jean*. etc.

2° LAXATIVE WATERS : *Désirée*, *Précieuse*, etc.

3° RECONSTITUTIVE WATERS : *Rigolette*, *Magdeleine*, etc.

In fact the patient is sometimes astonished never to see them dry, even after three or four months of dryness under a torrid sun. A curiosity of which Rabelais mocked cynically incites to ask, where the waters can come from, which neither temperature nor air can modify. — *Gelidæ fontes!* — They are always fresh, gaseous and so agreeable, that they seek them with as much pleasure as the season is hot, the atmosphere dry and burning.

If the question is not clear enough, still the ground for hypothesis is not sufficiently great to stray far.

In those countries where snow and ice do not last long to explain why the fountains of Vals send forth the same volume of water continually at all seasons we must refer to the intervention of the rains and aqueous vapours which are deposited in the form of dews the more abundant as the sky is pure and the mountains woody.

If we are to believe what is said in geography, these causes are sufficient to produce streams and even rivulets.

But there are other causes still which play a certain part in the formation of the fountains of Vals.

On these mountains situated to the west of Vals, in the circle of about 18 miles, there are several lakes, the lake of Issarlès between them, which occupy the craters of some ancient volcanoes, at the bottom of which most probably a certain quantity of water is left to cool. But the geologists have not recognized that these lakes or rather sheets of water are often very extended. These pieces of water are found in the interior of certain mountains and serve as the basin of alimentation and the springs are sometimes very numerous and extensive.

These springs may have for their origin the lakes or sheets of water of which we have spoken or they may be produced by the rains or other atmospheric vapours. The alkaline waters of Vals have an unrivalled mineralism, obtained from the subterranean volcanoes through which they pass, and from which they obtain at first their carbonic-acid properties.

In their course, more or less rapid and obstructed, the carbonic gas gives them a dissolving power, and so permits them to entertain carbonate of soda, which is possessed in abundance by feldspathic rocks. This *proto*-carbonate passes to the state of *bi* or of *sesqui*-carbonate, very soluble, and with which the water be-

come greatly saturated in consequence of the length of the journey they come in contact with it, as also from the great quantity of carbonic-acid which they already possess, and from the influence they exercise on carbonic-soda substances.

| It is still necessary to invoke the intervention of the carbonic-acid to explain the presence in the waters of Vals, of bi-carbonate of iron, of magnesia and lime, but to give a full and complete account of their rich and precious composition, it is indispensable to know precisely what goes on in the disintegration of the plutonic rocks, by electro-galvanic forces, which always play such an important part in the works of nature.

| The alteration of the gneiss of mica and of feldspath, that which Dolomieu calls the malady, and the English geologist, Lyell, the carie of granite, is caused by the dissolving power of carbonic acid alone or in water.

| The quartz is very resistant, and gives nothing to the springs of Vals, of which the work of mineralisation is as well given in the *principales of Geology of Lyell*, where he says in part XII, page 141: « In all countries, but particularly in the neighbourhood of burning or extinct volcanoes, the springs throw out « a very great quantity of carbonic acid. This elastic fluid has « the property of decomposing several other rocks even the « hardest it comes in contact with, and above all the rocks so « numerous of which feldspath forms a principal element. It renders the oxyd of iron soluble in water and contributes to the « solution of matters composed of lime-stone. »

Thus composed, the wathers of Vals gush out of the openings that they make for themselves or that the hand of man has made in the rocks, thereby forming the outer covering or crust of this country. One is raised by an interior hydraulic pressure and rests in layers, the other by a gazeous pressure which tends to give the type intermittent.

The waters of Vals ought to be classed under three heads, namely :

1° *The reconstitutive tonics* or those which have at the same time more of bi-carbonate of soda, carbonic acid, and iron. Notwithstanding the special properties which all the others possess in a less remarkable degree these are most elective in giving iron and colour to the globules of the blood : and in being greatly

charged with chloride of sodium, have the greatest effect on the hematosiis. In one word they are more tonic and more reconstitutive than the neighbouring waters. The waters in Vals, which have these properties also, are *Rigolette* but more particularly *Magdeleine*.

2° *The laxative or soda-magnesian waters.* These waters are a little chalybeate, but full of bi-carbonate of magnesia. Laxity is their special quality, but still only in a gentle manner, and answer to requirements of the particular indications of the diseases of the liver. The doctors know and appreciate this everywhere. *La Précieuse*, and better still *la Désirée* are the nearest types in Vals.

3° *The temperate and sedative waters.* They have but little soda in them and are best adapted for acheings. One of them, *Saint-Jean*, is slightly arsenical.

We have endeavoured to give our reader some details of the carbone of soda waters of Vals.

In knowing of all the riches of the hydro-mineral waters of Vals it would be difficult for us to remain without calling attention to them, as Atrié did to the waters of Aix, and for a greater reason :

« What a better favour could God have done for the sick in
« the country of Vals, than to give them the numerous and
« various springs, which in their indications embrace almost all
« the chronical diseases, and which, by their different degrees
« of mineralisation, furnish to the practitioner a truly therapeutical scale. »

FIRST] CATEGORIE

TONIC RECONSTITUTIVE WATERS.

Spring Magdeleine

The water of the Magdeleine spring, is of all the carbonic of soda waters the one to which the greatest attention must be paid. When chemically analysed this water verifies 7 gr. 28 of bi-

carbonate of soda per quart; it is the only one which can attain such a proportion of alkaline salt. This spring is sufficient to make of Vals a first class station for alkaline waters, and we may say that of its kind it stands alone.

With this enormous quantity of salt of soda, it has to a very high degree the properties of being altering and dissolving, qualities so often searched for in medicine. It is then the water from this spring which must always be chosen, when the hydro-mineral treatment requires very alkaline waters.

Finally if we remark that it is very gaseous, full of chloride of sodium and that it contains more carbonate of iron than the other springs, it must be considered as furnishing the most constitutive alkaline waters of Vals.

The temperature is 15° centigrades and it gives from six to seven thousand quarts a day.

Its flavour is slightly alkaline, nevertheless agreeable to the taste, and the patients who are sent there, in almost as great a number as to *Dominique*, appear to drink it with pleasure. If treated in Vals, diathesis which alkaline salts modify, as certain herpes, gout, gravel, diabetis, this is the spring resorted to. There are other diseases, which can be happily and quickly modified; those for example who require the nervous system strengthening if they have no other indications, such as constipation or a very great susceptibility of stomach.

If persons accustomed to alkaline medication have failed in the treatment by analogous waters, it is to this spring we would direct them.

Rigolette spring.

This name rather singular in french comes from « Rigole » (gutter). It is 16° centigrades in temperature, and partakes but not in so great intensity of all the constitutive and tonic properties of the Magdeleine spring, the amount of iron is nearly the same, and the bi-carbonate of soda is not so great in quantity, it possesses the most carbonic acid and chloride of sodium.

We shall read in the next chapter the profound and favourable modifications these two last elements, so largely contained in the water of the *Rigolette* spring, give to the animal economy.

Then one will not be astonished if this water is much searched for to oppose to the atonic *diarrhœa*, *gastrorrhœa*, *enterorrhœa*, *chlorosis*, *anemia*, *leucocytemy* *leucorrhœa* and other symptoms, which produce or cause frequent dyspeptic troubles, requiring the use of alkalines combined with tonic agents.

Its power of reconstitution in chronical asthenies which have almost brought on cachexy, its happy influence when it is necessary to give energy and vitality to the nerves proves to us its real elective property or if they like better, its result which goes sometimes to produce a constipation, an effect easily opposed when there are as in Vals sodo-magnesian waters of which we will speak.

The excess of carbonic acid communicates a piquant flavour and most agreeable, and gives as to the spring of Saint-Jean the property of creating a gaiety in those who employ them.

SECOND CATEGORY

SODO-MAGNESIAN LAXATIVE WATERS.

Spring Désirée.

Amongst the alkaline springs of Vals, of which the water possesses largely the special property of carbonate of soda, the most interesting one for the physician and without contradiction is that of *Désirée* because you will find in it a very elective action useful in the treatment of a great number of morbid diseases.

In fact it is slightly purgative but not in such a manner as the waters of Sedlitz, Pullna or Niederbronn but as those used a few years ago, under the name of *saturated magnesian waters* and which were no other than a dissolution of carbonate of magnesia in water, obtained by adding carbonic acid.

It contains about a gram of bi-carbonate of magnesia per quart, and however little this proportion may seem, as regards to the effect they wish to obtain, they soon perceive when the patients

have used for four or five days the waters of « *Désirée*, » that a dose of magnesia is sufficient to destroy the constipation amongst the great number of them and even to produce diarrhoea in some.

It possesses almost as much carbonic acid as the water of *Rigolette*, and after the water of *Magdeleine* it contains the most carbonate of soda. It has but ten milligrammes of iron; it has also an elective purgative action; and it is for this reason that persons, affected with constipations difficult to be relieved, are sent here. Those affected with diseases of the liver form a great number of the continual visitors, say nothing of those who come here to cure constipation and with a view of the alkaline properties that it possesses at a superior degree. The chloride of sodium which it has in a great quantity does not permit a depressing influence on the economy.

The water of *Désirée* is 16° centigrades; it has a *sui generis* alkaline flavour approaching that contained in oysters and to which one becomes easily accustomed.

Active and passive hyperemias are by it easily resolved. It would appear, it was to this, M. Herpin of Metz alluded in the following words: « The alkaline gaseous waters even in chronic diseases of the chest, in dispositions to pulmonary phthisis, above all amongst very sensitive persons subject to pulmonary congestions and inflammations are of the greatest help. »

It is then of the best utility if a gouty or some other metastasis is to be feared on the important organs. An article we published two years ago in the Medical Gazette on this water may pertinently be quoted here:

« Amongst persons stout, plethoric, or disposed to sanguine congestions in the brains, the water of *Désirée* of Vals is very applicable (2 glasses at every meal), notwithstanding that it maintains constant internal ease and it assures and accelerates digestion, and apoplexy and congestion occur in general during a laborious chylication. Otherwise if it is not to be said in an absolute manner that every joy comes from good digestion they cannot deny that the regular digestive functions are the condition of good health, and longevity. In the opinion of philosophers these attainments are not without charm or utility, as Cicero reminds us when he says.

« *Ille vir, haud nec magna re, sed plene fidei.* »

Spring Précieuse.

This spring is situated close to *Magdeleine*.

Considered with regard to physiological effects and curative economy, its waters may be regarded, if we are allowed to use this term of comparison, as younger sister of the former. "They give activity to the digestion and secretions and relieve the nervous system ; " in one word, they possess the special propriety of carbonate of soda, but containing a little bi-carbonate of magnesia, as a laxative, they produce the same effects as those of *la Désirée*. Only it is necessary to take a little more at a time or to continue their use a little longer.

As the waters of *la Désirée*, they contain but 10 milligrammes of iron to the quart and almost the same fixed elements (See table). The temperature is 15° centigrades, and though being one of the most mineral of Vals, it is nevertheless one of the most agreeable to the taste, wick results most propably from the intimate mixture of its elements, or rather from the complete solution of the carbonic gas wick may be found there ; because it can be found there in greater quantities than at *Saint-Jean*, for example, if you fill a glass or a tumbler with the latter you will not find the gazeous bubbles form so numerous, or so rapidly. From the taste there is belief that it contains 5 grammes 8 of bicarbonate of soda per quart, and about 2 grammes of carbonic acid.

The morbid diseases wick require treatment at this source are somewhat similar to those of *Désirée*. Yet there is a distinction to make wick does not escape the physicians ; when they want to obtain by our soda magnesian waters a gentle relaxity it is to this spring (*Précieuse*) that they go, and they make use of it, without fear of abuse, as of a tramaing médecine, if I may say so. They are very good for *dyspepsis and lymphatic constipations*, but if the constipation is very great, more idiopathic, it is at the spring of *Désirée* they must have recourse, because, its laxative action, being more marked, may perhaps be considered as the commencement of a real revulsion in the intestines.

THIRD CATEGORY

SEDATIVE TEMPERATE WATERS

Spring of Saint-Jean.

The waters for *dyspepsis* in their simple state, or for *gastralgy* even in the moments when pain is present, the alkaline drink for children, and no, doubt the best water for table use known is furnished from the spring of *Saint-Jean*.

It is the standard of the temperate and sedative waters of the carbonate of soda springs of Vals. We say of Vals because, in power the waters are not to be equalled anywhere else, but at the same time on the borders of Volane in the same neighbourhood, there are two or three which have a very near resemblance in the ordinary elements of carbonate and sodate.

But *Saint-Jean* possesses more sensible traces of the presence of arseniate of soda which renders its elective action more certain and its employment preferable, even in the cold periods of neuralgy.

The flow of this source is abundant. The temperature of the water is 13° centigrades. The taste is perfect; it passes easily through the stomach, awakening and strengthening the digestion, and persons using it are not long in finding an improved appetite. It gives great excitement and liveliness even to persons who have a character naturally sad and melancholy.

The feeble though relative proportion of alkaline salts in the waters of *Saint-Jean*, permit them to be drunk in abundance for a long time, at meals or in their intervals, without any inconvenience, and with the view of strengthening or of continuing the effect obtained by the waters of other springs previously employed against the serious diseases which have called for their use. They may be administered to the young est children, who show any signs of diarrhoea, so common at the early period of their life. *The lymphatic dyspepsies of unimportant lesions, the simple gastric obstructions* the treatment of which belong to this spring, and we may remain satisfied in terminating what we have to

say If we repeat the end of an article published by us on this subject in the *Gazette des Hôpitaux* 1^{er} mars 1866 :

« The water of the spring of *Saint-Jean* will be, for the physi-
« cian, a treaty of unity between two treatments very emphatic ;
« it will also help him to continue and substantiate the cure
« obtained by the water of other sources containing much more
« soda. With our contemporaries of Vals, we say that by the
« relative feebleness of its minerality it makes the first step in
« ascension which seems to represent the bi-carbonate of soda
« waters of Vals, and the practitioners of this station consider
« it most fortunate for the patients of whom the painful or
« feeble stomach would be injured by the use of those waters
« which possess a greater quantity of bi-carbonate of soda and
« carbonic acid, even though the nature of the disease would
« seem to require treatment by a mineral water alkaline gaseous. »

CHAPTER II.

NECESSITY TO STUDY THE SPECIAL ACTIONS
AND ELECTIVE PROPRIETIES OF THE ALCALINE GAZEUS WATERS OF VALS.
THEIR THERAPEUTIC MECHANISM.
THEIR CONSTANT EFFECTS. THEIR MINERAL ELEMENTS.
IN ACCORDANCE WITH ECONOMY.

Even, in 1854, the learned accademician Patissier, in his « *Guide to the mineral waters* said. » “ In a state of health the waters of Vals taken as a drink, augment the appetite, render the digestion easy, regulate the alvine ejection and produce sometimes a purgative effect. The circulation becomes more active, the skin a little warmer, and they impart an unaccustomed force and liveliness. A few glasses of this water is sufficient to alkaline the urine and perspiration which are naturally acid. ”

The eminent practitioner acknowledges in our soda waters a general economical action, not taking into consideration its proprieties particular or elective ; they are relaxing and revive the circulatory, sanguinary and lymphatic system. M. Lefort says : « Every hydrologist chemist, every physician knows how great an interest, is attached to the comparative examinations of springs situated close to each other. They know that these springs communicate in general by natural drains, and that the same reservoir generates them. But however having the same origin, it very often happens, not to say always, that waters found near each other do not contain the same weight of fixed principles, whether it is because they take longer to come to the surface, or they do not possess the same constitution, or finally because they mix during their ascension with sweet water. Thus modified the waters acquire new proprieties which the physician can derive advantage from.

When we proposed to divide the carbonic of soda waters of Vals under three heads : 1st *The reconstitutive tonics* (*Magdeleine* and *Rigolette*) ; 2^d *the laxative* (*Désirée* and *Précieuse*) ; 3^d *the sedative temperant* (*Saint-Jean*), we sought to harmonize

the results of experience with hypothesis of theory. If we refer to the synoptical table (page 3), if we recollect the short description we have made of the springs, we will be convinced we have anticipated M. Lefort's considerations, so true and so practical to our mineral soda waters.

Analysis have been made with care and science. MM. O. Henry of the Academy and Dorvault able chemists especially in the analysis of mineral waters wrote on this subject and nothing is a better guarantee of the veracity of the results the published. They prove that not one of our sources is identical, and if their waters contain more or less of the same principles, there are in the one medical agents which are not to be found in the other but in insignificant doses.

It is evident that this difference of proportion in their common elements, that this variety of nature in their particular mineral principles give to the three categories of the above waters different curative proprieties. A physician who needs to apply to the cure of sickness not only notes their *special* actions but their elective ones.

The first, common to all the alkaline waters of Vals, is very different in intensity, according to the degree of mineralization of the springs. This difference is always produced by agents which are found in all these springs; the bi-carbonate of soda and carbonic acid which at once disperse humours and stimulate the nervous system. This special merit deserves to be studied. With the water from the spring Saint-Jean, for instance, and the dose of 1 gr. 48 c. of alkaline salt per quart, the same effect will not be obtained as with the water of the spring Magdeleine, which contains 7 grs. 28. The physician ought to be aware of this fact, and ought not to be deceived by administrating these waters indifferently.

As to elective actions it would be easier yet to show of what interest it is to study well the influence of an element more or less in waters issuing close to each other and of the same kind. One example will be sufficient, a cholera will be quickly cured by a water gaseous alkaline, but at the same time chalybeate; if this condition should lack, the treatment will be long and uncertain.

In short, it is established, that the alkaline springs of Vals possess between each of them notable differences. The chemical

and clinical analysis of the physicians of this station agree on this point. We are therefore obliged to admit for these waters a mode of influence on the economy common to all springs and called *special action*, then another varying according of the category of the sources and called *elective action*.

You may see now if it is possible to explain how is prepared and effectuated the cure of sickness by mineral waters : if their influence on the health is a constant one, and lastly what are the physiological and therapeutic effects of each of these medical elements, extremely diluted in the gaseous alkaline waters of Vals.

Consequently we will touch by this study, what is to be said of the bi-carbonate of soda waters of Vals and review the bi-carbonate of soda, carbonic acid, the bi-carbonate of iron, the chloride of sodium, and lastly the bi-carbonate of magnesia, for it is to these medical agents that our waters owe their special and elective actions.

BI-CARBONATE OF SODA. — When in the stomach, this salt of such common use at this period produces at first local effects, then the part which is not decomposed is carried in the circulation, and causes physiological actions general and complex.

According to MM. A. Bernard of the Institute, Blondelot, and other observers, if very diluted, its first effect is to saturate the acids which are free and superabundant in the stomach, it alkalines them, but soon, after, according to M. A. Bernard, acidity is reproduced in the viscus, and a greater secretion of gastric juice is then occasioned. However it always renders the digestion more active and complete.

The manner in which bi-carbonate of soda acts on the digestion is followed by physiological effects of a high consideration. They efficaciously aid the patient to escape this vicious circle in which he is enclosed. Passing from bad digestion to morbid innervation and from innervation to digestion more and more incomplete.

The chyle is then better prepared and of a better nature. The blood receives richer and more reparative materials : the glands being better stimulated for the work of secretion the hematosiis becomes more perfect. And the blood which has acqui-

red the reconstitutive virtues of which it was deprived, improves the nervous system and every function which depend on it.

That part of the salt when decomposed in the stomach, says the honorable surgeon in-chief of the Hotel-Dieu of Lyons, M. Petrequin, forms there lactate of soda which aids the chyle and lymph to retain the nutritious material. Thus immediately the bi-carbonate of soda renders the digestion prompt and complete, reconstituting the humours and tissues, and finally leads the functions to perform their duty in a regular and proper manner. It does not confine itself to the economy, it even introduces itself in to the blood, because it is not wholly employed in the saturation of the acides and the formation of the lactate of soda. The element of soda, say the physicians, is better supported in our economy than potash, ammoniac and other fundamental substances, because its presence is more necessary.

It is entertained in the torrent of circulation throughout the whole organization, being an agent of fluidity and disaggregation but not a spoliator, says M. Mialhe, the learned president of the hydrological medical society of Paris, and these two actions give to it a very precious curative effect. In rendering the blood more fluid it permits it to penetrate through every tissue and acini of the glands more than before, thereby giving the secretions and the bile greater abundance. It also carries to the distant arteries the elements of nutrition, stirs the alkaline substance itself and brings back through the veins and other channels the anormal molecules which have there been deposited under the morbid influence.

It will be found amongst young children who are fed with rich and thick milk prompt and rapid symptoms of decline. But if they are nourished with fresh and thin milk you will soon find them recovering their health, requiring no other remedy to the milky crust (impetigo) with which they had been covered by bad alimentation. It is the same with the blood, being too thick, it nourishes badly and generates numerous diseases as a too clammy pith produces gum in the vegetable kingdom.

Bi-carbonate of soda gives to the blood a normal fluidity and become *reconstitutive*, without losing its disaggregating and ejecting quality, very useful in therapeutics, because it is necessary to extract the old material and to replace it by a new and more

solid one. We must be pardoned for this material comparison, for it happens when the liver or the nait are obstructed and treated by alkaline waters. This disaggregating propriety of the soda waters is spoken of by numerous physicians, principally Petit, of Vichy, who has celebrated the removing and lithontriptic virtues of the bi-carbonate of soda. He has demonstrated that when the acidous urines alcalize, all gravellous productions disappear.

From its double effect of fluidity and prevention of acidity it is often practically used for mixing with the milk given to children. By this means intestinal acrimony is destroyed, and diarrhœa, so frequent and dreadful in the first stage of infancy is prevented.

The alkaline render the blood proper to osmose, facilitate the respiratory combustion of the hydro-carbonate substances (sugary, amy loides). Mrrss Trousseau and Pidoux have classed the bi-carbonate of soda amongst *alterating* and *reconstitutive* agents, at first, because of its action on hematosis, and afterwards because the first condition of reconstitution is a proper hematosis of the blood. These two authors who published the best medical and therapeutic treaty we are in possession of, even add that this quality of altering and antiplastic ought to be employed in angine and croup to liquify and detach the pseudo-membranes.

One of the most glorious French physicians, Bretonneau, of Tours, said also that in the case of cerebral troubles which arise from acid dyspepsy, good results are obtained from bi-carbonate of soda. This fact is true, but is it not possible to say the same from the inverse proposition: When cerebral and nervous troubles are the result of bad digestions, the action of bi-carbonate of soda on the blood is reparative and is not the consecutive action of the blood apt to restore the normal state of digestion? Because the restauration of the nervous influence which it directs and stimulates, is the reestablishment of the functions.

The waters of Vals, especially those of *Rigollette* and *Magdeleine*, have appeared to us as acting principally on the innervation. When speaking of the diabetis and of other diseases we will refer to this effect, because to revive the nervous influx is the distinctive propriety of carbonate of soda waters.

To use a vulgar phrase the physician can rarely « take the bull by the horns; » it is necessary in morbid cases to use indirect means to attain the origin of the sickness. Sometimes strichnine

cures retention of urine when Catheterism has no effect. When the stomach does not perform its function through nervous derangement it is the true dyspepsy.

It would perhaps be the moment for us to ask what alteration bi-carbonate of soda determines in the economy when taken in great quantity and during a long time, diluted or not. It seems to us that its production is but a too active stimulation of the gastric mucus, as is given by several other medical agents, for instance, the essential oil of cruciferous plants; then we are led to believe that the abuse of alkalines cannot provoke the morbid state called alkaline cachexy, which remains to us a myth.

Every body knows that excess of alkalines in the blood is lost by urines, which remain alkaline as long as this excess persists. We will admit nevertheless that the question of cachexy is yet to be studied. To say so affirmatively there are but badly observed facts amongst valetudinarians, effected long ago. These men were under the influence of organic lesions, in which the alkaline waters have been able to precipitate the evolution, when they have been taken in an abusive manner.

We are aware that Magendy, in operating on the animals a true dissolution of the blood with an alkaline preparation, injected little by little in the veins, succeeded to provoke some typhus accidents; but the indirect manner of taking them, as drink, does not offer to the alkaline salt the same conditions of disorganisation. On one part the viscus assimilates or leaves in the blood but the alkaline substance in the quantity the economy wants, in the state of lactate or carbonate, and if these are too numerous, the elimination is quickly made by urines and other secretions. On the other part a natural instinct, an invincible disgust makes the patients refuse to drink soda waters when they are satiated, which often happens, notwithstanding the tolerance that they exercise in the use of this kind of medicine.

During three years Mr P..., had the diabetes, and refused to go to Vals: but he did not fail to take each day from 3 to 5 grammes of bi-carbonate of soda, and a bottle of the water of Vals besides (*Magdeleine* or *Précieuse*). This made about 10 grammes of bi-carbonate of soda per day which were introduced into a good and well directed stomach, together with from 10 to 12000 grammes of alkaline salt in three years. The cachexy has never appeared and nevertheless the patient is in a state of health which would seem excellent if one was aware that he had a little diabetes.

An other interesting example showing us the reconstitutive properties of bi-carbonate of soda in another manner.

Madame P..., of a lymphathic temperament, living at Route de Saint-Cyr-au-Mont-d'Or, Lyons, ten years since gave birth to an infant, viable and well constituted in appearance. After 72 hours it died from some unknown cause. Twenty months later, the same thing occurred under the eyes of Dr. Diday. During the third pregnancy we assisted the lady and we were not more fortunate. Notwithstanding all the precaution imaginable, the infant died 72 hours after its birth.

The *post mortem* examination was performed in our presence by the Drs. Poncet and Violet. A sole anatomical alteration was verified: the orifice of Botal existed, open sufficiently to allow the end of the little finger to pass, explaining thereby the reason of the successive deaths.

During the fourth pregnancy the lady again consulted us. It was then the thermal season and we sent her to Vichy, where during a month, under the direction of Dr. Villemain our honorable contemporary, she drank of the mineral water in the vicinity of l'Allier, she also made use of the prescriptions that she received and quenched without measure the ardent thirst which followed. On her return she told us that she drank more than 15 glasses of alkaline water per day. Not only was she cured of the alkaline cachexy but went to Lyons in an excellent state of health, and gave birth, two months after to a son, who lived 18 months.

At her fifth confinement, she refused to go to a thermal station, notwithstanding she drank the water from the source *Magdeleine* of Vals for three months, that is to say during this space of time she took 7 to 800 grammes of bi-carbonate of soda. She never appeared to be in better health, and her last infant is to-day 15 months old.

Here, the alkaline salt, though taken for a long time and at a strong dose, in the water of *Magdeleine*, has been reconstitutive, not only for the mother but also for the germ which she gave birth to. We are then led to conclude that the bi-carbonate of soda, given in a gaseous mineral water never produces alkaline cachexy except that the subject be already predisposed to marasm or some organic disease, previously weakening all the ressources of life, but it acts by the fluidifying the altering and reconstitutive effects on the economy.

CARBONIC ACID. — That which is taken in the waters of Vals, in drinking of the source of *Rigolette* for example, for every quart there is about 2 grs. $1/2$ of carbonic acid deposited in the stomach. A little is lost it is true but there is sufficient, dissolved in the water to perform a useful part in the digestion, whether by titillating the gastric mucus, it excites the secretion of the juice necessary for the decoction of the aliments, or whether it augments the peristaltic movements of the stomach and of the intestines.

We shall see a little later, that, in the affected organs, taken at small doses, the carbonic gas, by its nature analgesic and antiseptic, can calm the mucus and tend to heal it even though it be already the seat of slight ulcerations.

The notable part of this gas, which passes in the torrent of circulation, produces on the preparations effects necessary to the accomplishment of the normal functions. It is then but rational to give some account of the action of the carbonic acid on animal economy, when employing mineral waters as gaseous as those of Vals. Besides it is much better to set forth plainly all the medical proprieties of our carbonate of soda waters.

The ancients had already recognized the utility of gas as applied to the treatment of certain affections, and Pline said that the vapour from vinegar shed on marble, eased the pain of a wound. We shall not attempt here to repeat the history of carbonic gas so well treated in the monography of Dr Herpin of Metz (1864). It will be sufficient for us to say that, it has already been employed with success in many kinds of sickness by numerous physicians, and we would only remind our readers what the most recent experiments have shown on the physiological effects of this medicinal agent very abundant in our springs particularly those of *la Rigollette* and *Précieuse*.

Coming in contact with the skin they produce almost instantly a very strong heat activating the functions of this membrane. Very soon this feeling is augmented by a duration of the application and replaced, a little later, by a sort of analgesical insensibility, then, by a torpor bordering on anesthesia. We will come again to these facts in speaking of baths, and we will show all the effects one may, at once, draw as a stimulating and sedative means on the cutaneous system; for from numerous observations it seems clear that the baths of gaseous alkaline waters and those of pure carbonic acid have nearly the same action.

On the mucus a sentiment of heat and of tingling is produced; in the mouth it has a sour and agreeable flavour that every body knows; in the stomach it has a titillation and a soothing heat by which the secretion of gastric juice is increased.

The part of gas which is not lost by belching (and the habit of gaseous drinks diminishes this phenomenon) this part we say when it remains in the viscus, is soon carried in the general cir

culatation and a kind of ebriety ensues as in the case of alcoholic liquor or of champagne wine.

Experiments undertaken by Webert brothers, on frogs, prove that blood vessels are excited by carbonic acid as they would be by galvanism. Mr Brown-Séquart has shown that injected in the pulmon of an animal which has just died, it is sent out by the excitation it produces in the tissues of bronchi and pulmonary areolas, whilst this fact of repulsion does not appear if azote of hydrogen is injected. The same physiologist ascertains also that the heart of a frog, out of its breast and giving 20 pulsations per minute, gives 50 or 60 pulsations when in a bath of carbonic acid; from which he concludes that this gas excites the nervous and muscular system.

Other experiments are added to confirm this and lead us to think that, in the heart, the movements of sistole and diastole and that of almost every muscle, even the peristaltic movements of the intestines are produced by carbonic acid, which would explain the persistance of these, several hours after death.

Analgesical on the skin, it becomes equally so on the wounds, and experiments made on very painful ulceration prove it a greatodyme for pains.

This propriety has very often been a benefit in the treatment of organical hangrened lesions, particularly that of the breast and womb.

We have seen that on the skin it becomes from analgesical an nesthesical; it produces the same effect in the most intimale part of the organs and in the whole economy. Dr Banam has operated on abcess without pain, as if ether or chloroform had been used. The patient had breathed in an atmosphere composed of three ourths of carbonic acid and one of air.

The disinfecting and anti-septic proprieties of carbonic-acid have been proved, even in the worst case of ulceration. Then it may be considered as useful in the sickness where putrid degeneacy occurs, in the abcesses of the liver, catarrh of the bladder, and numerous lesions so happily modified by the use of our bi-carbonate of soda waters.

It is known that carbonic acide inside as well as outside the body decreases the severest pains, and renders healthy the ulcerations of bad nature. This propriety well known.

n this gas, of modifying the surfaces and tissues with which it comes into contact better explains so prompt and remarkable cures obtained by the waters of Vals even in very long standing cases of cachexy.

If all the testimonials of ancient practitioners who have employed in their therapeutic *fixed air* were to be enumerated, with all the morbid symptoms relieved or cured by carbonic acid we should excite incredulity, even to ourselves. But if we show to physicians that carbonic acid on the skin, as well as in the interior of organs, is at first exciting, then sedative, anti-septic, cicatrizing and resolute; from this, better proof will arise than from the nosological, accommodating which might easily be exaggerated.

The most important thing, for our thermal station, is to recall the opinion of those who are the most competent practitioners in the therapeutic proprieties of carbonic-acid. According to them, the alkaline waters charged with a sufficient proportion of this gas, and in this case are our waters, not only preserve the proprieties inherent to this medical agent, but yet its effects are considerably increased by the special action, dissolving and resolute of soda, so that these two substances together, the waters acquire a strong, more penetrating, and decisive influence in the majority of morbid lesions.

That which is the best is that which is also the worst, says Æsopus when speaking of the tongue. In physics the same thing can be said of the most terrible and dangerous agents, when their use is well employed. Life is impossible without oxygen and this breathed in too great a quantity death ensues. If the deleterious properties of carbonic acid are only in view, it must be considered as dangerous. But when one knows its medical properties, and that it is indispensable to life, the numerous physicians and physiologists, who have for the last 50 years studied and meditated, on this subject, will be trusted, and the conclusions will be that in our mineral waters carbonic acid is more than the complement of soda. To end what we have to say on this therapeutic agent we will relate the words of M. Terpin de Metz (*carbonic acid*, 1864) :

« This gas makes its appearance in therapeutics where its importance will soon increase. When the use of Antimony, vaccin

matter, or heterisation was at first established, their effects were exaggerated by the ones, denied or undervalued by the others; the same occurs with carbonic acid. »

It ought not to be considered as a panacea, however it produces on the economy very remarkable effects; it has effected often hopeless cures in diseases where other very rational medications had not eased.

CHLORIDE OF SODIUM. — The water in some springs of Vals contains salt in quantity large enough to make it sapid, agreeable, and increase its medical properties. We will shortly examine what salt causes in animal economy.

The most ancient books establish its dietatical utility. It is proved by the immense trade of which it is the object in all the earth even amongst the wild nations and by this fact also, that the strictest religious orders, from instinctive want, never interdicted its use. However they were unaware that soda and chlorhydric acid, were necessary to divers functions, and above all to digestion. The effect of salt is to cause fatness. Dailly, Suive, Boussingault, of the Institute, have proved it; they have said after comparative experiments what is the weight gained or lost by animals which are fed on food mixed with salt. Englishmen appreciate all its value, and it is always mixed with the food given to cattle intended for the subsistence of man. The salt, says Mr Boussingault excites voracious and venerian appetites. According to Poulain, the cows of Columbia, if deprived of salt become barren. Wardun asserts that an animal deprived of salt declines rapidly and may even die. Gaspard reports that in Holland cows fed with grass mixed with salt have been preserved from epizooty, which occurred in this country. Several observations have been made on man. Pluvier says that salt strengthens, and Barbier that Russian tenants to whom their landlord had prohibited this condiment grew languishing, pale, weak, subject to a generation of intestinal worms, and then anemic by the decrease of the globules and albumine of the blood.

An important constitutive part of the body is composed of salt. The lymph, the chyle, the mucus, the gastric juice, the bile, the urines, and every liquid contains it, but is in the blood that it exists in greater quantity. According to Liebig the proportion is constant and the excess is rejected by urines and respiration. It is not only found under the form of chloride of sodium but transformed.

It then constitutes alkaline salts, soda, and chlorhydric acid, which for the first time Mr Cl. Bernard has discovered in the plasma of the blood.

Alkaline gaseous waters of the springs *Rigolette*, *Désirée* and *Précieuse* contain this salt in sufficient proportion, they are consequently to be chosen in the treatment of certain affections when the blood grows poor, as in albuminury. This is more clear if we examine the connexion of salt and its derivatives, with the principal substances which compose normal state.

Wundt suppressed salt in his alimentation and on the third day his urine became albuminous; Hartner injected pure water in the blood, and the subject became albuminurical: then he injected salt water and albuminury disappeared. Schmitz by analogous experiments attained very interesting conclusions, adopted by Mr Cl. Bernard, such as:

Albumine would not be free in the blood but united with salt which it maintains in dissolution; soda would form with it a permanent albuminate. The fat would owe to the salt its margarate and its oleate, and the action of salt may be seen in the transformation of bile, urea, etc.

At last by its elements, soda and chlorhydric acid, by its combinations, phosphate and carbonate of soda, by itself, the salt has different parts to perform in the respiration and production of humours. Endosmose, exosmose and dissolution are favored, bile alcalanized by salt which, according to several authors produces chlorhydric acid free from the gastric juice.

It will be answered that salt is easily found everywhere. Yes, as iron, sulphur, and so many other substances are found, the action of which, if taken separately, is not to be compared with that produced by mineral water.

BI-CARBONATE-FERRO-MANGANIC. — The iron present in the water of the Dominique spring is the object of the following chapter. To this is due a great part of the remarkable constitutive proprieties of this new therapeutic agent. We will speak with more detail consequently of iron as a medical agent, when we study the history of our ferro-arsenical water, however we will give a few words on its physiological importance and of its advantages when given in an alkaline gaseous water.

One knows that it enters in the composition of the hematosis of the blood. It is also said that it is one of the elements which oppose to its dissolution and maintain the globules in their discoidal forms. Without insisting much on the part it takes in respiration, we will recall first that oxygen introduced at first by this function into the blood is specially carried on these globules which become very red (arterial blood), and that the discoidal element, thus oxygenated, carries to the tissues this gas of life which combined with carbon produces carbonic acid. This last, carried by capillary vessels of the lung is soon ejected.

This continual movement of oxygen and carbonic acid would not be produced without the presence of iron. If by an effect often indiscernable this metal is wanting in the circulation a disease ensues.

When given in an alkaline gaseous water, extremely diluted, bi-carbonate of iron is not required in great quantity. There, in fact, nothing is lost and it performs immediately the physiological functions which are its attribution. A part is transformed in the stomach in lactate of iron, and carried with the other part, which is not decomposed, in the lymph, then in the blood with the aid of the lactate of soda, which at the same time is formed in the viscus; so in any alkaline gaseous water perhaps better than in another martial preparation, iron is in a condition to perform the part for the support of life.

Experiments, made in 1847, demonstrate in the blood the normal existence of manganese. If this fact be true, and prof. Petrequin appears to have no doubt of it, it is a precious advantage offered by some of the waters of Vals to have iron and manganese combined.

By this fact the several rapid cures we have witnessed are explained. They are owing to the sources *Rigollette* and *Magdeleine*. We will admit also that this medication benefits of the other re-constitutive elements contained in these waters, their medical effect on the digestion and nervous system is decisive, and otherwise would not have occurred, taken in so small doses.

BI-CARBONATE OF MAGNESIA. — Magnesia is the medical agent the most commonly used for slight purgations. The condition it requires to perform its effect, is to meet in the stomach and intes

tine with acids which convert it into dissoluble salt, Then its effect on the mucous is not inactive but stimulant and laxative.

From this occurs to the mind the idea to use for purgations natural magnesia salts, or to combine it with citric, tartaric or sulfuric acids which render it dissoluble and form purgative preparations of a taste generally disagreeable.

The bi-carbonate of magnesia possesses the same proprieties. It is found in some springs of Vals (*Précieuse, Désirée*), and though its proportions be relatively small, about a gramme per quart, it acts nevertheless as a sedative, after a use of four or five days and sometimes sooner.

If we consider that our above mentioned laxative waters contain a little of sulphate of soda besides a great proportion of bi-carbonate of soda, which singularly increase the secretion of intestinal and gastric juice, one will not be astonished at the results procured by the small quantity of bi-carbonate in dissolution in the waters of *Désirée* and *Précieuse*.

Here is a most extraordinary fact. In the Niederbronn springs, says Mr Patissier, such a light dose of magnesia exists that it is scarcely 30 centigrammes, whilst artificial Sedlitz water contains 100 times more, yet with a glass of this water, he adds he purged a patient, to whom a bottle of Sedlitz water, containing 45 grammes of magnesia, caused no result. It is a fact, as Dr Lorretan, of Loèche-les-Bains, says with reason, experiments prove every day that a small quantity of carbonate of magnesia, contained in mineral water, produces a laxative effect equal and sometimes greater to that obtained by larger doses of the salt when artificially dissolved, as administered by apothecaries.

Finally, if we add that in our bi-carbonate waters the presence of the salt alkaline aids the bi-carbonate of soda and the other mineral agents to ascertain the complete digestion, we shall have said nearly all that may interest a physician desirous of curing chronic diseases by the use of soda magnesian waters. It only remains with us now to relate some examples of the results which have attended the alkaline gaseous waters of Vals. This will be the object of the following chapters.

CHAPTER III.

DYSPEPSY, GASTRALGIA, GASTRITIS, GASTRO-ENTERITIS, GASTRORRHOEA STOMACHAL AND INTESTINAL VERTIGEOUSNESS, ETC.

One third of the patients who go to Vals are led there by this morbid and complex state, which cannot sustain any exact definition and is generally called dyspepsis (bad digestion), a term which is used at this period to represent a number of diseases.

It would be wrong to call indistinctly all the infections of the liver *dysporeas* (bad respiration) and in the same manner it is wrong to extend the signification of the word *dyspepsy*, thereby losing the view that bad digestion is but a symptom. They use this term to represent lesions of different kinds and we have seen with pleasure Dr Beau give the first signal of representing the disease in terms more definite.

If we stop for an instant to study dyspepsy considered as a diseases distinct and in report with the carbonic soda waters of Vals, we shall find that it is the result, amongst many people, either of sadness, excess of work or other circumstances, which have simply given a digestion, slow, laborious, incomplete, sometimes accompanied with vomitings, acid eructation, borborigmus and inodorous flatulency, but without characteristical alterations in the other functions, without known anatomical pathological reasons, of which the symptoms seem to be dependent of a diminished innervation.

Under the name of dyspepsy we will only understand here this lesion of the digestive apparatus, particularly of the stomach, of which indigestion, flatulency and acrimony of stomach and gastrodynny are the results ; we will reserve for the other diseases their original names. It must be considered that sympathetic dyspepsies are very often diseases the seat of which is far from the stomach, and a well-established diagnostic ought to think it a primitive lesion.

If the essential dyspepsy of which the march is ordinarily slow and which may last for many years, either in a continued manner or frequent repetition, does not present at first a state of

gravity which endangers the life of the patient, nevertheless the anatomical alterations of which it is the cause are to be feared. For instance the stomach may not be the theatre of frequent indigestion and of other dyspeptic troubles, without injury ; it is the same for the organs which perform their functions in connection with it.

Soon the true dyspepsy is replaced by chronical gastritis, by the obstruction of the tunics of the stomach or other lesions which extend further in the sphere of activity and throw the patient into a state of incurable cachexy.

The alkaline waters of Vals unite excellent conditions to prevent any kind of dyspepsy, we mean by this to say; that, whatever may be the phenomenon which accompanies it, generally we use the waters of *Saint-Jean* spring. It nearly always prevents the slight disorders of the stomach. A water containing a great quantity of mineral principles is not wanted in this case, because it would be most inconvenient by producing a too great irritation of the gastric mucus instead of stimulating it.

From recent observations too great a quantity of alkaline salt taken in the stomach neutralizes the acids it comes in contact with; but soon after, by a physiological action, acidity is increased in the viscus because a greater secretion of this juice, naturally acid, is occasioned. Thus a water which possesses too much soda maintains the disease whilst *Saint-Jean* water succeeds in curing the sickness.

In dry dyspepsy its success is often prompt “ because the insufficiency of the gastric juice ” says prof. Pétrequin; “ has nothing astonishing if one remembers the great quantity necessary for nutrition. ” It is the same in acid dyspepsy when the patient suffers in the throat, the mouth, and the gums, a sensation compared to that produced by vinegar.

One of the best advantages of the station of Vals is to possess several springs slightly mineralised, above all, the spring of *Saint-Jean*, of which the water contains some traces of arseniate of soda of an applicable use when dyspepsy is accompanied with pains.

It is the best of drinks for dyspeptics ; it soon restores good digestion to those who have been long deprived of it. Thus by this means the patient is arrested in the way which would con-

duct him from a lesion of functions to a lesion of tissues ; because, as we have said, simple dyspepsy is always connected with the failing of innervation which generates sadness, melancholy, then cachexy a result from all these morbid disorders, arising themselves ordinarily from poor blood.

The result of the use of *Saint-Jean* water is to revive immediately the appetite. The patient ought to mistrust this happy change and obey only little by little to this renewed instinct. He must for a few days gradually strengthen the stomach, before taking what his appetite would seem to demand.

If it be complicated with diarrhoea *Rigolette* water will be an excellent aid, if with constipation the water of *Désirée* of *Précieuse* may be used from time to time.

GASTRALGY AND ENTERALGY.

Under the first of these denominations the physicians generally agree to designate a state of morbidity sufficiently common, which may be known by an intense pain of the stomach, coming at intervals, sometimes regularly but not always and lasting from half an hour to five or six hours, during which the patient complains and groans, and makes every effort to soothe himself ; his respiration is anxious, he is covered with a cold sweat, and often nearly fit to faint.

During this crisis, patients have been seen to refuse the most simple remedies, whilst others have been relieved by some aliment. The dolour does not always appear after a meal, and sometimes there is no relation between them. This circumstance, the nature of the crisis, their intensity, and their sudden disappearance have led to the thought that it was neuralgy of the stomach.

The etiology of this affection is obscure. Yet hypothesis does not fail. When one will have said that it is more common from 20 to 50 years, and more frequent amongst women than amongst men, the subject will be but little clearer.

But one may assert that gastralgia is the result of neuralgic or rheumatic metastasis and it is to these causes which produce these morbid forms we must refer to explain its origin.

Different forms of gastralgia have been attempted, but we shall see

only differences according to age, sex, temperament and intensity, therefore we will not as in the case of dyspepsy consider it in chapters according to the diseases of which it is but an accessory. It would be useful to have in physic, as in other sciences, a clear and exact manner of speaking and not to confound gastralgia with dyspepsy which is very often, but not always, a symptom of it.

Enteralgia offers such an analogy of causes and effects with stomach neuralgia that we think they ought not to be separated. The seat is different, and frequently morbid troubles occur at the same time in the stomach and intestines and thus ought to be called gastro-enteralgia.

People injured with those periodical pains are numerous in Vals during the thermal season. They generally get better and are often cured if treated by alkaline and not very mineral waters ; they become worse if a water possessing too much soda is employed. This observation agrees with an article published by one of the most celebrated physicians of Vichy (letter 5, on Vichy, page 101). He says that they are obliged to send away from this station the patients sick of gastralgia because the mineral waters of Vichy possess at least 7 grammes per quart of fixed elements whilst our carbonic of soda waters contain but two or three grammes.

By its temperant sedative waters Vals, surpasses the analogous mineral water stations. *Saint-Jean* spring, which contains the least of mineral principles is one of the most useful from this reason. It may be of use because it would be impossible to employ a liquid possessing alkaline salt in quantities three or four times larger. Besides it is supplied with a quantity of carbonic acid sufficient to obtain the effect we have spoken of in chapter II. Its arseniate of soda proves that it is a sedative for the nervous system and very applicable to cure pains, to speak in the terms of the clever nosologist we have mentioned above.

OBSERVATION ON GASTRALGIA

Miss A. of Yssingaux (Haute-Loire), 39 years old, well constituted and occupied in her family with easy work, suffered during a year very acute pains in the epigastrium ; these pains, which had an unknown cause, happened at unequal intervals every 3 or 4 days and lasted 4 or 5 hours irradiating towards the pylorus. An excruciating pain affected the patient and it appeared to diminish when slightly oppressed. At first opium had relieved her, but did not prevent its return.

Sulfate of quinine and iron did not succeed, and Doctors Chardot and Pipet sent her to Vals on the 1st of July.

Each nevropathic access augmented her general weakness, the loss of appetite and the diminution of digestive forces.

Her complexion was yellowish, and she could not perform her ordinary duties without slowness and indolence.

In the intervals of access, the stomach was little sensible to pressure, the tongue white, the pulse regular and a little concentrated. Anorexy, repugnance for anything greasy and several another dyspeptic phenomenons, as eructation of inodorous gaz, borborygms, were the only symptoms persistant, and, contrary to that which often occurs amongst the gastralgical, epigastric pain was not soothed during the crisis by a small quantity of aliment.

Rigolette's water produced a sensation of heat in the stomach of the patient, and she was affected by a very violent access of gastralgy.

The water of *Saint-Jean*, on the contrary, was very supporting, and she took from four to six glasses a day.

On leaving Vals on the 23rd of July, miss A. considered herself as cured, because she had not had an attack for nineteen days. Dyspepsy had ceased, her skin had become a good colour, and her physical and moral activity were fully restored.

In enteralgry or Cullen's idiopathical colics in numerous nevropathical states, even when the water of the spring of *Saint-Jean* has not a direct effect on the suffering organ, nevertheless it exercises no less an influence on these affections and powerfully concurs to their restoration.

OBSERVATION ON ENTERALGY.

Mr D..., forty-two years old, a cultivator in Monteron, close to Uzès, active and of good constitution, was affected three years ago with intermittent fever, and took for his restoration strong doses quinine.

From this period he was often fatigued by slow and difficult digestion. During two months he was affected from time to time, principally after his meals, with violent colics though he lived in a very moderate manner. He felt a sensation of contorsion and excruciating pain around the umbilicus going towards the left hypochondres the bladder and other parts of the belly, of which the muscles contracted violently.

In this enteralgical paroxysm the patient complained of difficult respiration; he felt very cold: his pulse were almost insensible, but frequent and concentrated. The warm cloth or small pressure of the belly relieved a little the pain, and the expulsion of the gaz seemed to mark the end of the crisis.

Though little desirous of travelling, because he feared an attack during the voyage, nevertheless he was persuaded by Doctor Bouchon to come to Vals where he arrived on the 6th of July.

The belly was slightly sensible to pressure. The milt appeared a little tumefied, the tongue white, the pulse 72 minute. His legs were weak; finally we observed a little constipation.

This last circumstance persuaded us to give him the water of *Précieuse* but he could not drink it, but a prompt relief was manifested from the use of an arsenical water containing a little soda. After twelve days the nervous affection appeared, nothing; after 23 days of treatment (7 or 8 glasses per day), he departed a little feeble; his digestion was perfect and he had not those dreadful colics which he feared, said he, more than death.

The water of *Sain'-Jean* have we said, owes a part of its sedative action to the little quantity of arseniate of soda that it contains. In effect the archives of the physicians have registered several observations on gastralgia and other nevralgies cured by very small doses of arsenic, one or two milligrammes a day. We have ourselves witnessed this fact several times.

Dr Vétu of Dijon reports that during two years a lady was affected with an alternative eczema of the face and gastralgia and possessed always one of those diseases. Those two diseases opposed numerous treatments, finally *Saint-Jean* water was victorious in healing her. This cure is a new proof of the efficacy of arseniate of soda in numerous cutaneous and stomachal neuropathical affections.

CHRONICAL GASTRITIS.

At the period when Broussais, the celebrated professor of the Academy of Paris was publishing his observations on the diseases of the digestive tubes and particularly his treaty on chronical phlegmasy, gastritis was considered a very common disease by a great number of practitioners.

We remember the reaction which followed, in the excitements of which (says prof. Anr^e) it had been almost denied that it existed alone. To day how many physicians admit amongst inflammatory chronical diseases, hepatitis, cystitis, splenitis, etc...; the existence of gastritis then denied, as if the stomach was the only organ shielded from irritation and morbid influence which consequently follows.

Stomach endangered every day by highly spiced aliments, by alcoholic drinks, is charged with important functions; on its nervous and very sensible system even moral impressions have an effect; and according to these physicians, it would be insensible to any influence except that of poisons. We must mistrust this exhibition of ideas perhaps a little ancient, because systematical innovators refresh sometimes more ancient yet ideas. The dyspepsy, which Molière jests about, and which is a symptom common to a great number of diseases fills to day the place of gastritis.

Ne pourrons-nous jamais, sur l'Océan des âges,
Jeter l'ancre un seul jour !!!

Let us not conduct ourselves as the astrologist of the fable, and we will not be said : *Oculos habent et non videbunt*. With res-

pect to the disease we are speaking of, and to its disappearance from the books of nosology, we will repport Mrrss Monneret and Fleury's article on gastritis published in their *Compendium de médecine pratique* : " Formely, the least uneasinesss towards the basis of the breast or some other symptoms as slight as these, were immediately called gastritis : to day a tongue as red as blood, as dry as leather, an intense thirst and a violent pain are the symptoms which correspond to the idea of gastritis. The men who know how much human mind is deceivable will easily comprehend these vicissitudes and repeat the words of the wise : the spirit of man is like a drunken man on horseback, when he falls on one side and is put right, he will fall on the other. »

The ventricle is not invulnerable ; on the contrary it is often affected by acute or chronical inflammation, that is to say by gastritis. Then, whether this is the produce of direct attacks on the stomach of poisons or other irritating substances, imported into that organ, or the result of a troubled innervation, or of rheumatic, herpetic, and other effects, the co-existent dyspepsy is never any thing but a symptom.

Gastritis appears by a pain of the epigastrium, this pain sometimes obscure, becomes very acute after meals, has no similitude with the pains of gastralgy. It is not the same acuteness nor the same form, often periodical ; sometimes it gives a feeling as if a heavy rod traversed the lower part of the sternum, and is often accompanied with dyspeptic pains and vomitings. The tongue is whit, dry, or charged with saburral thick matter. Diphterical macula have been found on this organ, of which the sides and the extremity are often red-coloured.

The gastric mucus has had an appearance sometimes red and friable, sometimes softened, in prof. Andral's autopsy (*Clinical médecine*, tome II). The anatomical lesion, can increase to ulceration or perforation of the stomach. The treatment of this disease has been for the last years greatly improved, not by giving interminable diets and by invariably applying the lancet or leeches. Such were the successes of substitutive medication, that is applying to chronical gastritis as in the chronical inflammation of the palpebral mucus, that it must be preferred to the debilitating system preconized by the physicians of Val-de-Grâce.

The alkaline waters of Vals produce their first effect by sub-

stitution, the mucus is excited and the inflammation, which they lead, more quickly, to a regular and resolute course is changed. Their carbonic gaz then produces on the sick membrane anasthetical effects and bi-carbonate of soda, by its general action on economy, disconcerts the symptoms. To choose a water of Vals one should take into consideration the intensity of the pains, and to the acutest pain, the least mineralized water will be opposed. The small quantity of arseniate of soda it contains, its feeble degree of mineralization lead us to prefer the water of *Saint-Jean* spring. This precept has been happily put into practice by one of prof. Bernis' patients.

OBSERVATION ON CHRONICAL GASTRITIS.

Mrs B., 34 years old, very nervous and of a delicate complexion, lives in the best condition of health, in a cottage on this side of the Rhone, not far from Valence. She has not suffered any moral shock which may disturb the brain and have its echo in the stomach, producing there dyspepsy without physical causes and anatomical appreciable lesions.

However, these eleven years, having attempted to perform the office of nurse, her digestion grew slow and painful, her tongue white, the side and the tip being a little red. The epigastrium is almost alway painful and after meals sympathetic palpitations of the heart prevail.

The general meagerness, the paleness of the face, the pulse nearly indiscernable, the thirst, the nauscas, some vomitings denote a chronical gastritis and a primordial lesion, the seat of which is in the stomach. The first three or four days after her arrival at Vals, Mrs B. had such violent pains in the stomach that we were obliged to use a plaster of opium and hemlock, *loco dolenti*.

The examination of the patient confirms what Doctor Berne had written, giving the description of this general state of atony produced by long and acute irritation of the viscera, that quinquina iron, the water of Spa, etc., had not been able to destroy.

On the 14th of July, infidel to the above-mentioned prescription, the treatment was begun by *Désirée* water. Diarrhœa soon manifested itself. The water of the spring of *Saint-Jean*, on the contrary well received by this debilitated constitution, was then ordered and used during 25 days. Its first effect was softly stimulating then, two or three days later, a sedative effect in the stomach, and from that time the patient made rapid progress in health. She departed as well satisfied as one may be by a first thermal season after so long a time of suffering.

During the course of her treatment Mrs B. had spontaneously tried the springs more mineralized but the evil increased, and, notwithstanding the desire she had, as almost all patients have, to run from one spring to another, finally she resolveld to leave all the merit of her restoration to the waters of the spring of *St-Jean*.

Gastritis is, with the Germans, the chronical catarrh of the sto-

mach, often the chronical bronchitis takes its place, and it is not rare to find both these combined.

However, whatever it may be, with chronical gastritis, the atony of the muscular fibres of the stomach has for result to prolong the sojourn of the aliments in the viscera where they decompose; thence the arch of the epigastrium, regurgitations, etc. One can easily comprehend when the local atony is considerable, that the waters of our more mineral springs (*Rigolette, and Magdeleine*) ought to have the preference on those of *St-Jean*.

The physicians of Vienne and Prague, advise, in this morbid state, the employment of the alkalines which stop the decomposition of the alimentary substances and which also act as stringents of the stomachal mucus in a state of bloatedness. The carbonic acid of our alkaline waters contributes, in a great measure, to obtain these therapeutical effects.

CHRONICAL-GASTRO-ENTERITIS.

When the gastritis extends far its sphere of activity, or, as say the physicians beyond the Rhine, when the stomachal catarrh, descends in the intestines, in short when it becomes chronical-gastro-enterites, the treatment must be a little different, and for this reason we intend to give some short considerations on this subject.

The symptoms differ from those of gastritis. Vomiting is very rare, the pain is rather a kind of uneasiness in the flanks and bottom of the belly, which flatulates sometimes. The peristaltical movements of the intestines are obstructed, which causes constipation, flatuosity and emission of gas; the coledoc canal is irritated, the bile through this is retained and reabsorbed, and produces a sort of icterus; the skin becomes yellow, pale and terreous; the emaciation and flaccidity of the flesh are manifest; the tongue is covered with a thick coating of saburral matter of a white yellowness. The digestion is sometimes a little better than in gastritis but yet imperfect; finally slightly febrile movements appear, with some at night or about an hour after the meals.

It may happen that pain and the phenomena of reaction are more considerable, because the material alterations of the gastro-

enteritis may go from the simple redness of the mucus to mollification, hypertrophy, and even ulceration.

In general, the more a disease is grave, the more it seems that the remedy ought to be active. They often, in the hydro-therapeutical minerals of Vals apply an inverse conduct, and it is to the most grave gastro-enteritis that they give the least mineralized waters, and with success, more or less in the commencement of treatment. Those who are obstinate in taking the waters the most sodiacal, notwithstanding the warning given to them, forfeit their cure and often fall back to a worse state.

If the water of the spring of *St-Jean* is convenient when there is a vigorous pain in the stomach or the belly, it is not the same in a great many other cases, and the treatment of the gastro-enteritis by our alkaline waters ought to vary according to the manner in which they form the alvine evacuations.

In the first stage of irritation, the secretion of the mucous flux diminished, there is constipation; and it is to the soda-magnesian springs (*Désirée* or *Précieuse*) that one must resort. On the contrary, when the ejections are liquid, without tenesmus, in an advanced state of the disease, and in a more chronical form, it is to a reconstitutive tonical spring that the patient must go (*Rigolette* or *Magdeleine*). These waters, strengthening and astringent, are convenient for all the affections which are accompanied by atonous diarrhoea or considerable anemical state.

CHRONIC ENTERITIS AND DYSENTERY.

Besides the gastro-enteritis we have just spoken of, the intestines are often the seat of chronical affections susceptible of cure, but we shall not speak of those which are quite incurable.

Enteritis is sometimes met with amongst those who come to Vals; but the symptoms have one analogy great enough with those of gastro-enteritis, and we will therefore dwell on it, but an instant.

The history of the different forms of enteritis has given rise to some excellent monographies; that, amongst others, of Dr Louis, on the typhoid fever. This too vast subject with which the alkaline waters of Vals can be but very little connected will not be spoken of in these pages.

We will say a few words only on the enteritis by chronical irritation, of which diarrhoea is a symptom almost unavoidable, and which is often accompanied as a consequence, then as a cause of duration, by the thinness and atony of the membranes of the intestine.

A part of the alkaline salt, taken in a liquid, is entertained in the intestine, where it is absorbed by the radicles of the vein porte; it then operates locally on the enteritis.

But its influence is still more general, and, as say Mrrss Pétrequin and Sôcquet, “ It is always by the excitation of the assembly of » the forces of the organization that the alkaline waters act at first » on the morbid conditions, whether they are local or general, and » which they oppose; secondly it results in a modification of the » material or functional state of the organ affected, that is to say, » that they commence by reviving the health in general, and finish » by re-establishing the diseased organ, in making the economy » pass by a period of excitation before arriving at a calm. ”

It may then be easily conceived that the alkaline gaseous waters of Vals, acting locally on the enteritis by the water which traverses the pylorus and descends in the intestinal tube, then in a general manner, having affected the organization, in fighting against the depression of the subject, tend by two different ways to obtain the success against the disease. Then, as the stomach is not painful, one may give without inconvenience the most mineralized water as it will be seen in the following observations.

We shall add that the alkaline baths are at this time excellent auxiliaries, in aiding the elevation of the vital activity, by restoring the functions of the skin.

We have published in the medical newspapers an observation on enteritis furnished to us by a client of Dr Réveille, physician of the hospital of Nîmes. The diarrhoea was permanent, and the water of *Rigolette* was useful then in obtaining a happy result. We shall now see that the water from the spring of *Désirée* was equally successful, when the morbid state of the intestine inclined to diarrhoea and constipation alternatively, due probably to a lymphatic irritation of the rectum.

OBSERVATION ON CHRONICAL ENTERITIS.

Mr de L..., of Clermont (Puy-de-Dôme), aged 32 years, possessing a nervous temperament, and suffering for two years under the influence of an intestinal disease, which appeared alternatively in the form of diarrhœa and constipation. From the advice of Mr Guéneau of Mussy, he took the water of *Royal* for one year. However finally Doctor Bourgeade, of Clermont, sent him to Vals, on the 23rd of July 1866.

His tongue was white, but he had a very good appetite, and only a few hours after each repast he had motions sometimes very liquid and at others very hard and difficult. Nevertheless he felt strong and took long walks with pleasure.

His internal pain was not very vigorous, and constipation being the most frequent, we advised him to take the waters of *Désirée* and alkaline baths, with several shower baths which are in Vals of an excellent effect.

It is useless to follow the patient during the course of 22 days treatment; it will be sufficient to say that he left on the 14th of August having no longer irregularities in his alvine evacuations, and promising us a new visit the following year.

We should still have much to say to render complete that which would interest the reader on the subject of intestinal disease, treated by the waters of Vals. We will, however, content ourselves in recalling that we have published several observations on DYSENTERY, cured by the source of *Rigolette*, and refer to Mrrss Pétrequin and Socquet for explanation, of the results.

GASTRORRHŒA AND ENTERORRHŒA.

The gastrorrhœa, or mucous flux of the stomach, often in the commencement passes unperceived, and may become so serious as to terminate by death. (Autopsis of Mr Andral). The patient takes little notice at first; sometimes he tries bitter infusions such as sub-nitrate of bismuth or of Magnesia, but finally finishes by consulting the doctor.

This conduct is easily to be understood, when the viscous and transparent matters, rejected in the morning by regurgitation or by vomiting are not abundant and the functions are regular. But it sometimes happens that the glairs become very abundant; for they have been seen to go to the enormous quantity of from 300 to 1,000 grs., and that once or twice a day, and often then as

Cullin has remarked, they are accompanied by nausea, precordial anxiety and anguish; in fact, it is more than a simple accident, it becomes a real pathological state.

We will not go into long details on the subject of gastrorrhœa, of which a complete history has yet to be made, but simply say that we have attributed it to hypertrophy of the muciparous glands of the stomach, and to a perversion of the sensibility of the gastric mucus.

Enterorrhœa, which arises from glairy and frequent alvine evacuations, holds to a hypersecretion of the intestinal juice, and perhaps to a morbid state of the Pancréas. In that affection the reconstitutive tonical waters of the source of *Rigolette* is that which we recommend for success.

Gastrorrhœa not being accompanied by vigorous pains, is tangible by the very mineralized waters of Vals; and if constipation has long existed it is to the spring of *Désirée* that they should go as in the following example.

OBSERVATION ON GASTRORRHŒA.

Mr. Est..., of Venterol (Drôme), 32 years old, is sent to Vals by Doctor Long of Nyons. These two years he has suffered with digestive pains and obstinate constipation. That which annoyed him most and which caused him to come to our thermes, was regurgitations of glairious matters appearing every morning and sometimes during the day two or three hours after each meal.

On the 22d of July, the day on which he arrived, the patient had a tongue white, a stomach a little susceptible though he did not suffer; his appetite was good, his pulse calm and regular. In fact he complained of three things: regurgitation, constipation and a slight pain in the left knee where he perceived cracking when he walked. This last phenomenon was not constant, but appeared from time to time. We note particularly this last fact because it agrees with what we have often observed amongst gastrorrhœics, viz: the pre-existence of rheumatism in a stomachal morbidity.

We prescribed to him three glanes of the *Désirée* water to be taken night and morning.

On the 29th, constipation had left him and regurgitation diminished in force and frequency, but the pain in the knee appeared to augment. A knee-cap of flane, alkaline baths and several frictions with opodeldoch balm soon made it disappear.

On the 14th of August, he left much better, but not completely free from gastrorrhœa and took with him a case of *Désirée* mineral waters.

STOMACHICAL AND INTESTINAL VERTIGO.

There are several morbid states of the abdominal viscus which give to the patient a sensation of vertigo; they see the object tur-

ning or flying ; the ground appears unequal and even they fear falling into an abyss and they suffer nausea and feel sick, as an unhabituated walsler, or as an unaccustomed sailor receives from the pitching and rolling of a vessel.

One has perhaps exaggerated the picture of hallucinations produced by this kind of vertigo ; but it lasts and is not cured, as quick as they say, by the employment of tonics and chalybiates. One is perhaps wrong to accuse too much the poorness of the blood as being the cause of these nervous troubles, in saying that the deglobulization of the blood causes the beginning of leucocytemy, because we have seen it equally amongst phletorical persons and particularly among women suffering of chronical metritis.

The stomachical vertigo has been observed and described long since, but prof. Trousseau has lately done so, with a still greater care. Dispepsy accompanies it and is, they say, its principal cause, but to us it appears far from being demonstrated.

Stomachical vertigo has been successfully treated by tonics and chalybeates ; now, these two orders of medication are to be found in our reconstitutive waters (*Rigolette and Magdeleine*), in the best possible forms.

It is on the intestinal vertigo that we will particularly call the attention of the reader, by an observation on a vertiginous patient in whom the stomach was healthy, whilst the intestines, the seat of *perityphlitis*, were the cause of all the nervous phenomena.

OBSERVATION ON INTESTINAL VERTIGO.

Several months ago, Mr D., 28 years old, suffered, two or three hours after each meal, a pain and unusual sensations in the stomach. It seemed to him that his intestines contracted or were going to fall out, an effect perceptible in the swig. Sometimes the symptoms were similar to those of sea-sickness.

He was sometimes affected with a kind an incomplete swoon of which he was cured by synapisms on his limbs, warm cloth on his belly, affusions of vinegar or Cologne water and warm infusions. The pulse was precipitated, very weak, and remained two or three hours before returning to its former and good state.

When the patient advanced his belly or raised his head again, nervous pains were increased ; they diminished on the contrary by a forward flexion. Doctor Trousseau noticed this phenomenon.

Physicians attributed the beginning of this disease, somees to a six hours walk in very hard rain, the others to a continued work or to moral vexations ; but it was not the matter.

After numerous tentatives they found in the cœcum a nearly insensitives tumour

about 6 centimetres long and 2 and a half wide, undoubtedly hidden in the beginning of the disease.

Caustic potash on the tumour decreased the local and general symptoms ; but vertigo, dyspepsy, weakness and thinness were persistent ; when the patient went to Vals in the beginning of June he drunk night and morning *Désirée* waters and *Saint-Jean* at his meals.

Twenty-five days after he was not to be recognized so much fatter and stronger he looked, and the most ancient of Vals' doctors said it was the most marvellous cure of the thermal season. Vertigo, which had lasted eight months, had also disappeared.

The perityphlitis is common enough among persons who do not wear suspenders, it produces constipation, other dyspeptic troubles, and often vertigo. It is to be cured at Vals by our soda-magnesian waters *la Précieuse* and *la Désirée*, which have equally succeeded with a patient who had an attack of an affection of the same nature and was sent to our thermes by Dr Serre, of Alais. It was a case of stoppage of the transversal colon, that the belly girded with a belt above the umbilicus had probably determined.

The visceral vertigo ought, in consequence to be studied as much as possible in the lesion which is the point of departure, and, that the investigation may be well directed, it is good to remember that in the stomachical vertigo, that inappetence, disgust for food, vomitings and epigastric pain appear immediately after the meals, whilst in the intestinal vertigo the pain is in the belly ; it is then constipation and flatulency ; finally sensorial troubles appear two or three hours only after the meal.

Against the first they employ the waters from the springs of *Rigolette* and *Magdeleine* ; in the second, they succeed better with those of *la Précieuse* and *la Désirée*, because they are accompanied with constipation. The same rule is always to be followed in employing the alkaline waters of Vals for the infections of the intestinal tube. Only, pain *elementary* for some, but for us *resulting* of morbid lesions, demand the usage of a light water, more sedative than exciting, that is to say the water of *Saint-Jean*.

CHAPTER IV.

DISEASE OF THE LIVER: HEPATALGY, ICTERUS, HEPATITIS.
HYPERTROPHY AND ANOMALOUS TUMOURS. — HEPATIC COLICS
AND CALCULUS.
CIRRHOSIS: FAT LIVER AND HYPOCHONDRIA

The connection of its functions with those of the other organs, the stomach and lungs particularly, their physiological actions specially, not yet well determined, its volume, its position, render the liver susceptible to a great number of diseases. We will not speak at first of those whose degeneracy is caused by the affection of tissues which are too profound, and the treatment of which by alkaline waters, would not very notably ameliorate the digestion, or give a very prolonged existence.

We will speak of those whose treatment appears justifiable by carbonic-sodiocal waters, and which we have seen in great numbers, during the summer, cured or relieved at Vals.

It is often very difficult in liver affections to ascertain the extent of the local disorders, which do not always give the acuteness of the general symptoms; and the autopsies of Mr Andral have, in fact, proved that often there is not a proportional correlation between the alterations, sometimes very grave, of the hepatic tissue and the morbid reactions to which they give rise. From this it is difficult to class the diseases of the liver, or give the real diagnostic or rational treatment. Yet, alkaline medication, is, at present the one mostly used for chronical affections of the liver, and when it is not the sole agent, it is, at least, the principal adjunct; because in the treatment by alkalines, by sodiocal-mineral water above all, the employment of other therapeutical methods is not excluded.

If it be asked: why such a great number of persons, possessed of diseases of the hepatic gland go to Vals? this question will be answered by M^{rs} Pétrequin and Socquet. Indeed they say: "By the use of alkaline waters, after some days, the bile is secreted very abundantly, the fecal matter is more coloured, which con-

tributes to ameliorate the digestion and to render ejection more easy. The alkaline waters are of excellent use in the diseases of the liver, and it is with reason that experience calls them *chologogue*."

To what do the sodiacal waters owe this generally-conceded influence? To answer this question is to give rise to many contradictions; we will nevertheless give it in the manner in which we understand it.

The liver may be considered as a kind of grapes, of which the microscopic grains, similar to acini, are as numerous cells, where the functional actions of this organ are performed. The matters for secretion and for the nutrition of the liver are furnished by the liver, and the different actions are normally performed if the humours, blood and lymph, are in favourable conditions. If the blood is too thick the acini are badly penetrated. The secretions are too thick and do not easily flow by their natural ducts; the nutrition of the organ is incomplete, and if already sick its cure is prevented.

All these impediments disappear by the influence of bi-carbonate of soda. The humours more fluid are easily put in contact with the inner tissue of the organ, which the blood penetrates with all its nutritive disaggregating and medicinal proprieties.

This is easily explained if one remembers, that blood is the spring of life as of death, and that when it possesses normal qualities its plasma passes better through the acini, facilitates the functions of assimilation and ejection, and then only the axiom *natura medicatrix* is justified.

Another noticeable and important fact for our carbonate of soda waters, and what gives to them an action better than that of the other waters, is their great proportion of carbonic acid. This gas is, in fact, analgesical in the pains of the liver, antiseptical in its abscesses, exciting and resolute in its atone hyperemias. Would it not be of use against biliary calculus, when we see the feldspathical rock softened and disaggregated by it.

HEPATALGY.

The neuralgical pain of the liver is generally rare, and may be confounded with the first crisis caused by the disappearance of bi-

liary calculus. On its access the patients cry. The skin remains white and some phenomenons, similar to those of gastralgia, such as nausea, vomitings, a diminution of pain when pressed, and an apparent satisfactory state of health is to be seen after its access.

Alcaline baths are in this case exceedingly useful. We will refer for the inner treatment, in preference, to the least mineralized springs, above all, that of *St-Jean*, the water of which is sodiacal arsenical.

ICTERUS OR JAUNDICE.

Icterus is the result of several affections of the liver or other organs (irritations of the rectum or of the stomach principally). Its most ordinary pathogenical cause is the obstruction of hepatic and choledochal ducts. The efficient causes of icterus are very numerous, and Morgagni reports that a moral vexation can immediately produce it.

From what we have said of the influence of the alkaline gaseous waters of Vals on hepatic gland, of their resolute properties, it would be useless to add anything on their effects on the treatment of jaundice. We will only say, that, in this morbid form, the bile decreases in quantity and thickens. It is the same with the intestinal juice; excrements are white, generally hard and difficult, the urines burning and of black yellowishness. It then will be easily understood that the laxative *Précieuse* and *Désirée* waters are of the greatest efficacy in the treatment of simple jaundice.

OBSERVATION ON CHRONICAL ICTERUS.

Doctor Lassale, of Villefranche (Rhône), sent us Mrs C..., 38 years old, slightly affected with pains in the right hypochondres; her pulse 75 per minute, her tongue white; the excrements white and difficult; some other dyspeptic phenomena existed; the skin and sclerotic yellow. Her menses were accompanied with very acute hypogastric pains which seemed proof of a chronical metritis. The complication, which we have already remarked in other patients, permits us to think that the pressure of swollen uterus produces a rectal irritation that may cause icterus.

Whatever it may be, these two affections were cured in Vals by thermal treatment.

On the 5th of July, the day of her arrival, the patient was ordered to use the soda magnesian water of *Désirée*. On the 30th, the general state was considerably improved. The metritis seemed nearly dissolved, because menses occur without pain.

Finally, on the 10th of August, every morbid phenomenon had almost completely disappeared. The icteric yellowness of the skin, seemed to exist but a short time. The patient departed and promised to finish her treatment at home.

HEPATITIS.

The liver, exposed to numerous causes of direct or sympathetical lesions, is often the seat of an irritation, from which inflammation ensues. It then takes a more considerable development, for tumefaction, as well as heat, redness and pain, is one of the cardinal points of inflammation; acute hepatitis is constituted by all these phenomena together. It is not yet a true hypertrophy, the cells are more extensive, from their accession, without having changed in form or in number. The nutritive juice and grains will be more considerable in every cell, and when the inflammation has ceased, the cells will be emptied by resorption, and the organ returns to its primitive volume.

By this resolution the inflammation of the parenchyma will end. The resorption of cellular contents is perhaps not effected, the organ remains as voluminous, is accustomed to this new state, which is not painful, and then the liver is affected with what they call chronical hepatitis.

We have already noticed the effects of the bi-carbonate of soda waters on the liver, to make understood how much their use ought to help the resolution of hepatitis in these two forms. The ejection of the hyperemic liquid is favored. The disappearance of that turgescency is hastened and the blood fluidified by alkaline resorption is hurried over.

Besides in the chronical hepatitis the waters of Vals act on the bile but not on the grains contained in the cells; thence persistence of a more considerable volume. We have, however, witnessed, chronical hepatitis completely resolved by *Rigollette* water.

OBSERVATION OF CHRONICAL HEPATITIS.

Miss R..., of Saint-Jean-du-Gard, more than 60 years of age, suffered some year ago accesses of intermittent fever; it disappeared, but the liver and the milt became obstructed. She is dyspeptic and often affected with diarrhœa; she has also nauseas, sometimes vomitings; her tongue is white, her breath is bad and bitter; her urines often blackish; the pain she is affected with, in the right hypochondres, extends to the shoulder of the same side, what is to be seen also in the hepatitis; finally, her complexion of a pale yellowness denotes an already grave morbid state.

On the 25th of July she began to use *Rigolette* waters, two glasses morning and night; this treatment was continued till the 14th of August; she was completely changed: the functions had returned to their normal action, and reconstitution was complete. *Rigolette* water was preferred with respect to diarrhoea; laxative waters ought to be used when constipation exists.

A most curious fact is, that the first three or four baths, taken in the beginning by Miss R. produced on the right hypochondres the same effect as synapism. Others would explain this phenomenon, if we had not witnessed it in rheumatical pains and read in Mr Herpin's work, which is so full of proofs, that carbonic acid in alkaline waters as well as in a bath of this gas, will often cure the skin, neighbour of a morbid lesion, from redness and sometimes pains.

HYPERTROPHY AND ANOMALOUS TUMOURS.

Inflammation and hypertrophy are closely connected. In inflammation as Virchow says, there is irritation of functions, and the increase of functions follows.

In hypertrophy the functions are exaggerated and nutrition modified. The cellular contents increase to a point of bursting its envelope. The grains of cells become little by little more numerous and voluminous, so that the first cells change their form, disappear, and are replaced by new ones which may undergo the same transformation.

Thence the organ has such an increase that, according to the degree of alteration, its natural functions are difficult or impossible, and they cannot be modified by any treatment. However it is not increase of volume of the cellular elements which produce hypertrophy, but their successive transformation; alkaline waters must be used as an impediment to the production of new elements.

As well as in the other glands, hypertrophy of the liver may be considered under two points of view, viz: with regard to the cells or to the elements of conjunctive tissues which surround the hepatic cells.

In the first case common hypertrophy is sometimes partial but generally extends throughout the organs. In the other fibrous tumours, more specially called anomalous tumours of the liver, the

growth is slow and without pain, without any great functional alteration. It can last a great while in this state.

Hepatitis has often been confounded with hypertrophy of the liver. However it is very useful to make a distinction and to recollect the beginning of the sickness so that the alkaline sodiacal properties of the water may be understood in these morbid cases.

These sovereign waters for curing obstruction of the liver (acute or chronical hepatitis) have but a limited action in general hypertrophy and anomalous tumours. The patient cited in the following, proves, nevertheless, that the thermal treatment of Vals is useful in partial hypertrophies of the liver.

OBSERVATION ON ANOMALOUS TUMOUR OF THE LIVER.

Doctor Vétu, of Dijon, sent to Vals Mrs G... For three years menses did not appear, and she is now fifty-one years old; she complains of anorexy, bad digestion, constipation and other dyspeptic troubles. Her tongue is white and covered with saburral matter; her pulse slow and regular, her complexion is yellowish, but the most remarkable alteration is constituted by a tumour in the right hypochondres, 7 centi. long and 2 and a half wide. When in the bath this tumour looks as incrustated in the convex surface of the liver which is inclined forward; this organ presents a more considerable volume than in its normal state, for it extends to the umbilicus. Formerly this partial hypertrophy was the seat, of acute pains and occasioned icteric symptoms very perceptible; to-day it is indolorous, and if it is moved it will be seen that it is adherent, hard but not renitent.

The nature of this tumour is obscure, but from the symptoms which were great 8 or 10 years ago, and which are now but slight; we are led to think that it is a partial and fibrous hypertrophy of the liver which followed an acute, then chronical hepatitis.

During nine consecutive years she went to Vichy; there, says our honourable fellow-phiscian, Doctor Nicolas, under whose care she was, the symptoms diminished to reappear some months after.

On the 26th of June we prescribed *Précieuse*, two glasses morning and night, and every morning an alkaline bath lasting for an hour; four days after, *Précieuse* water produced diarrhœa, and consequently we used this water with that of *Magdeleine* alternatively for creating regular motions.

On the 10th of July, her belly examined in a bath, looked more flexible, the tumour seemed flattened, diminished, but always encrusted in the convex surface of the liver; the patient was already getting better, and said that her functions perform their duties more regularly.

On the 26th of August, she had taken 27 baths; the surface of the tumour was 5 cen. by 2 wide, and seemed to get smaller. What is to be said is, that the dyspeptic symptoms have disappeared, and that, on her departure, she wished to return the following year to complete her cure.

COLICS AND HEPATIC CALCULUS.

This is a disease very serious, but it was still more so when the use of carbonic sodiacal water was not extensively known as a remedy for it. Without doubt the ancients had some knowledge of the utility of alkalines in this kind of affection because they had administrated several, amongst which magnesia was not forgotten. Nevertheless, useless remedies were given with confidence to the patients, and with good faith, even by the most celebrated doctors.

To withstand the bilious calculus, Morgani, according to the example of Boerrhaave, Glisson, Sylvius, and van Swieten, found nothing more preferable than the use of the means which to him appeared the most simple, as the juice of dandelion, or that of fresh grass, which all the world praised, said he, against this disease.

Since then, therapeutic in diseases of the liver has made great progress, and amongst the means of treatment prescribed with reason against the hepatic calculus is alkaline water, but better still the alkaline gaseous waters of Vals, which are ranked amongst the first.

It is known that hepatic colics are the result of difficulty in the calculus when they traverse the biliary ducts. Their narrowness and particularly that of the choledoque, render the colics more frequent and painful ; sometimes they are so painful that they draw the cries of men the most insensible, then they are accompanied with nausea, vomitings, fever, and other general and local troubles. When this foreign body has passed into the intestines they cease.

From this moment the morbid symptoms disappear little by little, and reappear in another crisis. Often they continue, and the patient suffers from indigestion and constipation ; his complexion is icterical and in one word he is under the influence of bad-health and continual apprehensions.

The employment of alkalines, and, above all, those of the alkaline gaseous waters of Vals, precipitate the migration of this foreign body, and render the crisis less long and less painful. The resolute action of the waters on the membrane of hepatic

conducts, of which the narrowness is very ordinarily caused by a state of phlogose and accordingly by the thickening of the wall, is very useful here. We consider otherwise as certain, that in activating the interstitial combustion, in rendering the bile alkaline, the sodiacal water, suspend or impede the formation of the calculus of the liver.

Notions on the mode of the formation of the calculus, their pathogeny in one word, is yet little advanced, though it has been seriously studied as well as the other diseases, the origin of which is obscure. We are, for want of better knowledge, disposed to rank it amongst diathetical predispositions; the hereditary influence spoken of in this case is very uncertain. As to the causes which determinate or occasion them, they have been alternatively searched for in the hepatic ducts and biliary vesiculus, in every age, sex, climate and alimentation, without one has been able to observe any thing positive on this subject.

It is known that the calculus takes birth in all the length of the biliary canals, and the vesiculus, just to the granulations of the liver, as well as for the uric concretions in the kidney. We shall search in vain for the truth amongst all the hypothesis explaining the original cause of the biliary calculus, therefore we prefer to say as doctor Chabanne : « Error of nutrition or result of a constitutional vice, the hepatic calculus is always relieved by the water of Vals. » We also add : By this medication its reforming is prevented, a result which the patients find still more preferable.

They have been advised to make journeys pretending that the shaking given to the liver by the movements of the carriage helps to detach this foreign body. Whatever value this means may have, it would not explain the numerous cases we have cured or given relief to in our thermes each year, of which we present two.

OBSERVATION ON COLICS AND HEPATIC CALCULUS.

Mrs D..., of Braisne, near Soissons, was affected five years with uneasiness and heaviness in the region of the liver. Every four months she was troubled with violent pains, followed, one or two days after, by an ejection containing small round calculus of a brown and greenish colour. In the moment of the crisis the skin became very yellowish. This symptom disappeared afterwards little by little, to reappear in the form of hepatitis.

She was 56 years old. She had received the assiduous attention of Doctor Hutin, of Braisne. At Paris she consulted Professor Piorry, and had there been zealously treated by his friend, Doctor Grimault, who sent her to Vals with a note containing all the particulars on the antecedents and medication which had been followed.

On the 7th of June, Mrs A..., before very fat and strong, was now in a considerable meagre state. She had a chlorotic complexion; her pulse was at 75, and accelerated after a repast, because the appetite existed and the digestion was weak and difficult. Her tongue was white, her belly pliant, but sensible to touch in the right hypochondres, where the liver did not appear voluminous; her stomach was renitent.

She had already been two years at Vichy, and during the interval of the thermal seasons, she made use of the mineral water of this station. She was not cured, and had followed, after that, treatment in Soultzmatt, where Doctor Grimault said to her: "Go to Vals, the waters are more melting." After two months hepatitis had left her, but the pain that she had felt was always present to her mind, and the thought of a return of the disease made her shudder.

From the custom the patient had of taking mineral waters it made us give her the most alkaline; we therefore advised her to take of the spring of *Magdeleine*, at first four then six glasses a day; that is to say, that she was to take about 16 grs. of bi-carbonate of soda each day. This and mineral baths daily, which were followed with great regularity, led to the cessation of hepatitis and establishment of good health, a blessing which exists yet, from 8 months.

When the colics and the hepatic calculus are felt by a patient previously attacked by articular chronic rheumatism, but only after the disappearance of the last, one is tempted to admit the pathogenical relations between these two affections. We commence by stating that in these conditions the alkaline gaseous waters are far from failing in their *cholological* reputation, they seem on the contrary to merit it more so, even when fever is not completely fallen.

Prof. Pétrequin of Lyon has given us an observation of a similar case. Under the same circumstances, we may remark, one ought to avoid exciting too much the patient by alkaline baths, therefore they should be taken but every two or three days; one may employ better the ordinary water with the simple addition of starch.

OBSERVATION ON COLICS AND HEPATIC CALCULUS.

Mr C..., 35 years old, lived in Crest (Drôme), where he occupied an honourable position in an industrial firm. Of a temperament nervoso-sanguine, he was stout and vigorous. Repeatedly he had been attacked with articular rheumatic pains which he compared to touches of the gout. For two years he was sent to Vichy, by his physician, the honourable Doctor Bricquet, and he did not receive any injury. In the second year it was otherwise, he was attacked with hepatic colic, which occurred 3 or 6 times, and that in Vichy.

The following spring he decided to go to Lyon and consult some of the celebrated

physicians. Doctor Pétrequin, after making him follow a regular and energetic treatment, sent him to Vals, on the 20th of July.

In the etiological study of this affection, on the subject of this disease, we did not find the trouble of the mind of which Morgani had spoken, and we searched in vain for the perturbing causes spoken of by the other authors, because this man led a sober, regular and happy life. We will take, for want of something better, as a point of departure, a morbid rheumatical process, because Mr C..., is always active and cannot remain long in one place.

He was often subjected to cold which had commenced the rheumatism, and of which the manifestation was then in the hepatic gland.

Whatever was the cause the disease was easily to be known. We remember that he had 5 or 6 violent hepatic crisis, and that small biliary grains had been found in the fecal matter one or two days after. We will add that the sclerotic is yellow principally in the face, which is of a ginger-bread colour, and in the same time the seat of a disagreeable itching more acute when the patient felt warm; the tongue was white, the taste bitter, the pulse was at 80; appetite failed, though the digestion was easy. Finally the urines were blackish, ejections very rare, whitish and difficult. When looking at the belly it was found rather large but not painful even and pliant. The foremost part of the liver is a little hard, and one or two inches below its ordinary position.

Ordinary constipation indicated to the patient to use the soda-magnesian water of *Désirée* spring. The patient took two then three glasses morning and night during his treatment. A laxative effect was produced after a week, ejections were easier, more regular and not so white.

On the 12th of August, after a treatment of 24 days, of which peripetias are uselessly noticed, the patient departed for Crest, remarkably improved: his strength was revived, his complexion was not affected with yellowness, and his sclerotic was nearly white. The outward part of the liver seemed to have returned to its proper place. The organs had then regular functions. The itching was the only symptom which persisted, as is always the case in the finish of the diseases of the liver. We have been told that the crisis has not reappeared.

CIRRHOSIS.

This disease is in general characterized, in its anatomical sense by a depot in an organ (liver, spleen or lungs, etc.), of special particles which have, as vegetable starch, the property of giving a fine blue colour if mixed with iodine. Besides the tissues attacked with cirrhosis are of a dull whiteness, transparent, and their consistence is hard.

The commencement of these modifications or at least their seat are in the small arteries, from whence the infiltration passes to parenchyma; then the permanency of the arteries is destroyed, and the organ which does not receive any blood is discoloured and withered. The matter which in these successive depots constitute the cirrhosis (amyloid degeneration) ordinarily appears in several organs at the same time, and they think it is carried and deposited by the

blood, an effect of the general morbid state. Indeed, to make a treatment by alkaline waters useful it must be commenced before the obstruction of arteries by amyloïde matter. In the beginning of the evil, whatever its origin may be, the carbonate of soda waters of Vals render the blood more fluid, favor its circulation and even, perhaps, resorb the matter; by them the general constitution being modified, the advancement of the cirrhosis is delayed, as we observed in the following example.

OBSERVATION ON CIRRHOSIS.

M. D..., cultivator, suffered for two years an uneasiness and heaviness in the right hypochondres. These confused pains seemed to cease for a time in the beginning of the disease. To a treatment the details of which cannot be transmitted to us, D... remembers only to have been relieved by benzoin applied on the liver. This patient sent to us by Doctor Ollier, surgeon to the Hôtel-Dieu, Lyons, with this indication; cirrhosis, the liver and perhaps organical lesion of the stomach. The skin, as in sclerotic, is yellowish and pale; a feeling of heaviness prevails in the hepatic gland, the volume of which seemed decreased. Digestion is bad, and anorexy is present. The patient had no desire for food. Diarrhœa frequent, the pulse at 80, finally a commencement of œdema may be seen extening to the ankle bone. The diagnostic of the eminent surgeon seems confirmed, but the stomach seems exempt of organical lesion.

Our intention was to return the patient, who arrived on the 25th of August, being hopeless of relieving him by a thermal treatment, the lesion produced being too profound. He begged to remain some days to rest and moderate the frequency of diarrhœical ejections. He was permitted to take two or three glasses of *Rigolette* water a day; after 10 days during which the patient had increased a little this dose; we were astonished to see his health greatly improved. His feet were not swollen, and the urine had become abundant, ejection natural. The following day the patient got better and better, his cheeks coloured, his strength returned; he took several alkaline baths. Finally he departed on the 20th of September, apparently cured, at least for an indefinite time; we may be allowed therefore to conclude that, even in organical affections, the carbonic soda waters of Vals are sometimes useful; and whilst *a priori* one would have been disposed to consider them as needless and un-serviceable.

FAT LIVER.

It is known that in the normal state, grease mixed in emulsion in the intestine, passes through the ramifications of the vein-porta, in the liver, thence in the bile, to be conducted by lymphatic ducts in the circulation of the blood.

If we suppose this migration interrupted by some obstacle, the greasy particles are accumulated in the hepatic cells and drops of grease will little by little fill the cells.

Such is the mode of formation of what is improperly called greasy degeneracy, for the elements of the liver are not altered, and the affection may be cured if one opposes the obstacles which favor the retention of greasy matter, and if circulation is easy. The alkaline gaseous waters are the best for this purpose, when there is nothing the matter with the alteration of the constitutive elements of the liver, combined with a greasy state; it is then another greater affection, which no medication has been able to stop.

Hypochondria was, some years ago, considered by nosographs, as a lesion of the liver; it is almost always a general nevropathy, and is connected with several morbid troubles of which the organic seat is of ten the most impossible to determine. We will speak of it here but occasionally, and will say that these lesions, the causes of hypochondria are frequently happily modified in the thermal station of Vals.

If, as we believe, the special action of carbonate of soda waters is to stimulate the nervous elements, the physician will conclude, with the most logical consequences, they are good for melancholy and hypochondria.

Before ending this chapter we will not forget to remark with all the practitioners, how generally inert is the functional state of the skin in the alterations of the liver. Not to see the diseases of this organ last eternally, it is indispensable to restore transpiration and cutaneous perspiration. On this purpose alkaline baths are precious auxiliaries in opposing obstruction or atrophy in the hepatic gland.

We will conclude : that the alkaline gaseous waters of our stations have a very incontestable utility in numerous morbid states of the liver. To use these waters with discretion, the rules, given for the alterations of the intestinal tube, must be followed for these diseases, and when pain prevails, the waters of *St-Jean* spring ought to be prescribed. If constipation is constant, the slightly laxative waters of *Désirée* and *Précieuse* will be indicated, whilst, on the contrary, when anemy or the weakness of innervation begins to settle, the tonical and reconstitutive waters of *Rigolette* and *Magdeleine* will be effectively applied.

CHAPTER V.

DISEASES OF THE NERVOUS SYSTEM. — DIABETES, ALBUMINURY AND CHLOROSIS.

Diabetes or sugared urines, was imperfectly discovered by ancient phisicians ; it was observed in the 7th or 8th century and yet 20 years ago was explained by hypothetical theories, and in regard to its etiology and treatment, one was in an inextricable cahos.

Since that time learned chemists and physicians, having studied with perseverance this question, its pathogenical and therapeutical history, have made great progress. They do not wait till the patient has arrived to a state of cachexy ; to ascertain the material character of this morbid anomaly, the means they employ at this period have sometimes prolonged for a long time the life, and very often cured the disease.

The therapeutical influence of the alkaline gaseous waters of Vals in diabetes will be better valued if a rapid glance is given to the pathogenical conditions by which it is produced.

Sugar is destined to maintain the heat in burning in the lungs, and to complete the so important functions of hematosas, respiration, and circulation ; the sugar is only secreted by the liver, and that independently of the alimentation, since it has been found as abundant amongst carnivorous animals as in those fed with sugary or feculent substances.

Hepatic gland, we say, is the sole agent of the glucogenical function ; such is the rational conclusion to which Mrrss. Cl. Bernard and Schiff have arrived by various experiments. So the liver, in the animals the first made an autopsy of, always contained sugar ; besides the blood of the vein-porta does not contain the smallest quantity, whilst it is found in super-hepatic ducts. M. Schiff arrived at the same conclusions, demonstrated by tyng the abdominal ducts so as to increase or diminish the flowing of blood in the liver and immediately produce or impede the formation of sugar in this organ. It is the same if he takes

away the liver from frogs, their blood is no more mixed with glucose.

When the sugary matter becomes excessive so that it cannot be burnt in the lungs, the surplus escapes by the urines ; this is what constitutes the diabetes, and this morbid manifestation, say Mrrss. Cl. Bernard and Schiff appertain to hypersecretion of the liver ; which they have proved by their experimental researches.

The quantity of sugar produced ought to be just what is required to equalise the functions, and, if, in the experiments made to elucidate this subject, they have found the blood more sugary after a repast, it has been necessary to attribute it to the excitation as well as the mechanism of the liver by the work of digestion.

When it is secreted the sugar being carried in the pulmonary, at a certain time after the repast, they do not find any more the blood which flows from the pulmon to be sugary ; this state is called normal. The diabetes, on the contrary, secretes too much sugar ; that which escapes to the hematosi traverses the kidney as a filter, and in this morbid state, the digestion excites the liver, still more augmenting the secretion, and consequently causing the urines to entertain a greater quantity of glucose.

Experience has shown that hyperemes of the liver is, in its turn, the next cause to hypersecretion of sugar or diabetes, and these physiological conclusions may be affirmed by the autopsy of Mr Andral, in which it is proved that hyperemical hypertrophy of the hepatic gland existed amongst those who have succumbed to the ravages of the diabetes.

We will now show that the liver secretes a sugary substance, very similar, but not identical to the glucose of grapes or starch ; but the excess of this production, or diabetes, is, from the latest account, the result of hyperemes of the liver. It is for us to respond to this question which naturally arises here. What is this hyperemes ?

It may be attached to two things : one transitory and producing a diabetes curable, the other permanent, and giving place to a diabetes almost incurable. We quote amongst the first, those which act directly on the liver : 1° traumatism, as in the example given by Mr Cl. Bernard, of a man kicked in the right hypo-

chondres by a horse, which rendered him glucosic for some time; 2° direct excitations of the hepatic gland, such as those given by Mr Trousseau, injection in the vein-porta of the azotate of uranium, ammoniac or other ; 3° irritation of the intestinal tube by aliments of a bad nature, or better by toxical substances ; 4° excitements, fatigues, and excesses of all kinds.

For the permanent causes we may find them added to Mr Cl. Bernard's history of the diabetes. This practical physiologist has discovered that the puncture of the fourth ventricle of the brain also causes glucose, and his experiences on the vasa-motor nervous system, prove that this system checks the general circulation in fact. That the lesion of the fourth ventricle leads, by paralysis of the vasa-motor nerves, to an excitation of the hepatic circulation, the effect of which is hyperemias of the liver.

Mr Schiff, enlarges upon this even. He proves from experimental researches that the lesion of the vasa-motor may extend not only from the fourth ventricle, but even to the antero-lateral cordons of the marrow.

The pathological conclusions drawn from these works have a very great importance, because it results from them that certain medullary lesions in the parts above quoted are the causes of diabetes, what was completely unknown until a very recent period.

After this excursion in the pure physiological field, we will endeavour to accord the anatomical alterations stated by autopsis on the subject of diabetes. That related in the clinic of prof. Trousseau shows a profound lesion of the nervous cells (greasy regression) of the parts of which we have spoken. The colloidal tumour of the fourth ventricle, which is mentioned, in the inaugural theme, by Dr Levrat-Perroton, of Lyons, is also an example of the incurable diabetes, which occur from profound and permanent lesions in the nervous system.

From this physiological study, it results that the diabetes may be divided into acute and chronic. Under the first form, when it is ephémery or comes from a general concussion of the nerves without paralysis, the disease is essentially curable. Sometimes the cure is spontaneous, other times it is obtained by appropriate treatment, but most surely and quickly by the carbonic soda waters of Vals.

Chronic diabetes, arising from paralysis of the vasa-motor

nerves, and which overpowers all the efforts of medical experience, leads to symptoms of weakness caused by the incessant loss of sugar secreted in excess.

The therapeutics of the diabetes ought consequently to have for its aim, first the attack of this paralysis which happily is not always complete, and of which the progress is stopped or decreased by the effect of the alkaline gaseous waters of Vals. We will repeat that their ordinary effect is an excitation on the nervous system produced by carbonic acid, effect which has been practically demonstrated by Mrrss. Brown-Sequart, Herpin (of Metz), and other physiologists.

Another very important indication favors this treatment, it is that one ought to oppose the general decline of the patient by the maintenance of the digestive functions. This very rational opinion universally admitted by practitioners, finds equally an easy prescription in the waters of Vals, because, if their special action is to stimulate innervation, their consequence is to stimulate the digestive functions.

The lesion or the cause which generates or maintains diabetes, is generally difficult, if not impossible to discover. This is of little importance to the treatment. If in fact, the glucosury is produced by an incurable lesion or complete paralysis, and it is the scarcest case, something would be tried to relieve the patient, and till now nothing seems to us preferable to the most mineralized bi-carbonate of soda waters. They do not cure paralysis, more than strychnine and other sthenical medecines, but they create better digestions, they give to the nerves which still live a certain energy necessary to the action of assimilation, and sometimes can defer for some years the moment of fatality.

When on the contrary this paralysis is incomplete or when the liver is attacked with pyperemy by a cause which does not belong to the nervous system, the waters of Vals become powerful, and observation on diabetes treated by the waters of *Rigolette* or *Magdeleine* have given results which undoubtedly demonstrated this fact.

How can this success be explained? We will return here to what we have said on the physiological action of carbonic-acid. This gas, so copiously contained in the waters of the above-mentioned springs, excites the nerves in the same manner as elec-

tricity ; if not completely paralysed they are sufficiently strengthened to allow the vasa-motor nerves to become the moderator of circulation and impede too great a quantity of blood to approach the hepatic gland.

The surplus energy communicated to the nerves is renewed as long as the same medication is followed, and it is of a greater duration when mineralized elements assist carbonic-acid. Therefore it is right to choose spring, the waters of which are in the best condition to produce tonical and reconstitutive effects. In Vals the water of *Magdeleine* spring is the richest in carbonate of soda and ferro-manganic salt, and has always appeared the most convenient for the treatment of diabetes, even for that which depends on a permanent cause, for if it does not cure, the progress is delayed and the symptoms improved.

Bi-carbonate of soda is to-day considered as an almost specific remedy against diabetes, according to its direct action on nutrition, then on hematosiis, that is to say the blood, and finally on innervation. Is it not worth the place assigned to it in the treatment of glucosury? Ought it not from its large quantity in the water of Vals make them the first amongst the means opposed to this affection? A doubt seems to have risen on this subject. In a recent article in a new dictionary of physics and practical surgery Dr Hirtz, the learned professor of therapeutics of Strasbourg, relying on his own observations and on those of Mr Triesinger, of Gubing, asserts that in the treatment of diabetes the carbonate of soda has not the least therapeutical influence. A great influence is given to this opinion by Dr Hirtz's renown and authority, but we will try to arrest the practical consequences, which seem to us difficult to admit at this period.

This negation is contrary to the opinion of the majority of physicians. They have not, for the bi-carbonate of soda, the infatuation which Mrrss. Boucharlat and Mialhe's theories had imported amongst their adepts, but they are satisfied with its efficacy, if not absolutely, very considerably ; we will compare opinion with opinion, and invoke that of prof. Trousseau, who, agreed with nearly all the practitioners, says (clinics) that alkalines skilfully used and aided alternatively by other bitter medicines, if they are not able to cure the patient, at least preserve him, and that in a better condition than formerly. We will add that some time

ago, in a discussion of the Society of Surgery of Paris, Mr Ver-neuil, resolutely attributed the cure of surgical accidents observed amongst diabetics to the use of alkaline. Every body knows the gravity of these accidents from the publication of the remarkable book of Mr Marchal (of Calvi).

If one only calls to mind the theories of diabetes expressed years ago, and the treatment, that is to say, the list of drugs they used to oppose it, amongst which were all the agents of medicine, from the most sluggish even to the most corrosive, creosote, for example; but never the bi-carbonate of soda.

We remember well, at this time, the glucosuric perishing and disappearing to the view in a few months. It was, as Rochoux said, a melting of all the body, whenever they found that it was necessary to utilize all the forces of the stomach, and strive, by the employment of analeptics, against the invasion of cachetical disorders produced by the diabetes.

Ten years later they began to administer to glucosurics bi-carbonate of soda, but with caution, one or two grammes per day. Nevertheless, small as this quantity of alkaline salt was, the life of diabetics was prolonged considerably; they did not die in a few months but lived for two or three years, nourished by meat and glutinous bread and filled with quinquina and iron, according to the custom of the time; nevertheless it was a great progress.

Ten years later still, they did not object to the proportion of bi-carbonate of soda, and they recognized that the best means to administer it, was, without contradiction, naturally diluted in a mineral water. Very soon the majority of diabetics began to live as all the world, and even for several, without excessive precautions.

This contemporary history is not, perhaps, a sufficient proof in favor of the action of bi-carbonate of soda, and consequently of alkaline waters in diabetes, and yet, on being given two diabetics, what physician, to-day, not willing to experiment *in anima vili*, would hesitate on the treatment to follow without believing he was abusing his power and the confidence accorded in him, in giving to one an immediate death through a corporal melting, notwithstanding all the tonics which were at his disposal, instead of, as in the case of the other, prolonging life, al-

most certain by the use of alkaline waters, when the condition of health is passable, or the morbid state led to that of simple infirmity.

The bi-carbonate of soda is now employed in the therapeutics of diabetes, and many years will pass before it will cease to be. It succeeds better when it is diluted and given with tonics and reconstitutives, circumstances which render the alkaline gaseous and feruginous waters precious in the treatment of this disease.

Why does it act favourably in the diabetes? Because it has succeeded better than all other medicines which were tried before it. It awakes the integrity of the digestive functions, and gives to the blood those nutritive qualities the want of which decreases so materially the vital activity of the nervous system. Thus alkalines and tonics assist to retard the progress of glucosury, even when they do not heal, and if we insist on the utility of this medication, followed at present by the majority of physicians, it is that we, as they, are convinced that it is certain. To stimulate the innervation ought to be the principal object in the rational treatment of the diabetes.

The strongly mineralized bi-carbonate of soda waters of Vals ought to form the basis of the treatment of glucosury, and we add, that they may, without prejudice, be employed in all pharmaceutical or hygienical means, which physicians know how to employ. We shall only make the following remark to establish what we have to say; strychnine stimulates the nervous system, but does not nourish it; the alkaline gaseous waters stimulate it and facilitate the nutrition, by their influence modify the digestive organs, the hematosiis, and nervous system even.

Of all that has been said on the subject of a disease which at present draws the attention of the medical world with double interest, we believe that we are able to conclude :

1° That the diabetes is a glucogenical hypersecretion of the liver, depending on the hyperemy of this organ.

2° That hyperemy or the cause of diabetes is the result of causes now ephemery then permanent, the most common of which is paralysis of the nerves which are the moderators of the circulation.

3° That in all these cases, the conduct to hold to by all the physicians, is to revive and sustain the innervation and at the

same time the digestive forces, and the means the most simple, and perhaps at the same time the most efficacious, seems to us to consist in the employment of carbonate of soda waters.

4° Finally, amongst these waters, it is still very necessary to choose those most charged with carbonic-acid, bi-carbonate of soda, salt of iron and other reconstitutive principles, that is to say those of the springs of *Rigolette* and *Magdeleine* of Vals.

We will terminate this work, perhaps already a little too long, by a sole observation: it merits the attention of those who are interested in our thermal station.

OBSERVATION ON CHRONICAL DIABETES.

Mr C..., 50 years old, and has had glucosury for 6 years. For a long time his urine has had 25 per 1000 of glucosc. We ourselves have sent him to Vichy for 5 consecutive years, where he received the advice of the honourable Doctor Amable Dubois. We will admit that the treatment has been favorable in suspending its progress.

In the 6th year he came to us at Vals, on the 20th of July. Being intelligent and instructed, he knew how to analyse his urines, and he there found 20 per 1000 of sugar. His tongue was white, digestion bad; he was oppressed but did not cough, his pulse was at 72.

Being accustomed to alkalines he drank 6 glasses a day of the water of *Magdeleine*, which was soon increased to 8 and continued at this for some time. He also took each morning an alkaline bath. Every two or three days he found an abatement in the production of the sugar of diabetes; after 18 days there were scarcely any traces to be found. Nevertheless he did not leave until the 25th. He was now no more oppressed; his digestion was good, and he was in a good condition of health.

On his return home, not following any particular regime, he began to suffer from boils, an effect which, we have already remarked, is produced by the usage of alkaline waters. Whilst he suffered from this disease the presence of sugar was not found in his urines but in an unappreciable proportion.

This work was finished when it came to us from an account rendered by the academy of medicine, according to which Mr Mialhe modified his chemical opinions on the subject of the nature of diabetes, and attributed it, as the physiologists Bernard and Schiff, to a primitive nervous alteration. To him this alteration lay in the nervous system entirely; this would be general nervous disorder; that of Mr Bernard, disorder of the pneumo-gastritis; and Mr Schiff's, a lesion of the seat of the fourth ventricle and of the antero-lateral cord of the marrow; in fact the vasa-motor nerves is their course. This, however, would not make us give

greater value to the theories and therapeutics than we have already done in detail.

ALBUMINURY.

The presence of albumine in the urines (in the disease of Bright) constitutes the material character of a general affection, and it may be easily known from the ordinary reactions of the albumine ; the heat or nitric acid often permit the disease to be opposed better at the commencement than at other times when it is further advanced.

In the summary exposition that we here give of the albuminury, we do not speak of anasarca or of the other symptoms of this affection, but we recall the most recent studies of which it has been the subject, to show that it is admitted that it most ordinarily leads to a general morbid state, perverting the hemato-poietic functions, whose result is, first an excessive production of albumine, which traverses the Kidney as a filter, then, little by little, when the cause of the evil persists, to enfeeble the subject, who finishes by falling into a state of cachexy.

Thus, the kidney is not primitively wronged in all the cases of albuminury ; but at an advanced period of that affection it is constantly altered, facilitating still more the transsudation of the albumine through this organ ; consequently the disease by reason of the causes or effects already produced, soon becomes ephemery or durable, presenting character of extreme gravity

It is not rare, in fact, to see phlegmasy, particularly that of the kidney, scarlatine, pregnancy, repercussion of exanthema or other transitory causes, render the urines albuminous, but immediately the cure follows, whether spontaneous or from a proper treatment. If in these circumstances alkaline waters are not indispensable, nevertheless, if given carefully, they facilitate the return of health by the modifications they make in the constitution of the blood, by their action on the urinary secretions and on the cutaneous exhalation. Their influence appears more valuable still, if they employ the slightly purgative waters of the soda-magnesian springs of *Désirée* and *Précieuse*.

When, on the contrary, the albuminury recognized is very serious, and the nature more permanent, the thermal treatment is long and the effects doubtful ; but yet, sometimes, amongst diabe.

tics, it is cured, or in retarding the progress of the emaciation and sustaining the languishing vital energies, it often prolongs life for sometime.

Un fortunately the patients whom we have had occasion to witness at Vals, have come there in such a grave state that we have always been obliged to apply to thermal treatment, and which they have not even been able to follow regularly, a complex medication; it has been impossible for us to verify the influence of the ferruginous carbo-sodiacal waters in the albuminury (disease of Bright or nephritic albumine of Mr Rayer), and, even, the good results that we obtained at Lyons, in scarlatine-anasarc, may perhaps be attributed as much to the remedies, which were administered at the same time, as to the waters of Vals.

Nevertheless, notwithstanding the absence of conclusive observations in favour of the carbonate of soda waters; in presence of progressive deterioration and marasmus, of the patient given up, without defence to the ravages of an affection little known in its pathogenical history, but which is believed, arises at first from a vice of innervation and sanguification; is it not allowed to try the alkaline gazeous waters of Vals as the means the most apt to prevent the loss of the forces and stoutness; and to retard the period of cachexy, when even the production of albuminous urines would be under the dependence of permanent causes.

Amongst the means proposed to oppose to albuminury is it necessary to mention iron, chloride of sodium and other tonical medicinal agents. It is almost superfluous for us to say here that the waters of several of the alkaline gazeous springs of Vals are ferruginous and possess to a very high degree the propriety of vitalizing the blood, — of reconstituting it, — not only in restoring the normal poorness of the globules, in rendering its plasma more fluid, but also in acting on the primordial phenomena of the innervation, which presides from the onset to the sanguification. If we add that they regulate the digestive functions, dispose the resolution of the hyperemias, it will remain with us to conclude, theoretically, it is true, but holding to the results, which, from the first, have confirmed us, that these waters are, for albuminury as for diabetes, the best foundation of treatment that we have as yet seen.

Then, if it will be remembered that Wundt has proved, by personal experience, that, the urine becomes albuminous if deprived

of salt, and that our springs, *Rigolette*, particularly, and *Magdeleine*, contain chloride of sodium, and at the same time iron, and more of bi-carbonate of soda than any medicinal water known, it will be admitted that we have at Vals naturally-mineralized waters the most efficacious in re-establishing the hematosical function and, consequently, opposing, by this action, the waste of albuminury.

CHLOROSIS.

Every year there come to Vals a number of young females who are chlorotic, and who return after 20 or 21 days of thermal treatment, having regained their vigour, natural colour, freed from palpitation, short-breathing and other functional anomalies which characterize the morbid state, and which are vulgarly hidden under the name of *paleness*. The most of them owe their cure to the use they have made of the ferro-arsenical acid water of the spring of *Dominique*, of which we shall treat in the second part of this collection. Yet, when the dyspeptic phenomena appear very pronounced, and when the stomach is irritated, we give the preference to one of the alkaline gaseous and ferruginous waters of Vals. Their success, for the most part complete, permits us to affirm that Petit, of Vichy, has not, in any way, exaggerated the efficacy of alkaline waters, in chlorosis, contrary to what has since been written.

This affection, generally considered now as a nervous disorder, does not proceed from the blood being deprived of iron, nor from its being watery, neither from other consecutive phenomena which must be combated, it is true, but will not be vanquished for a long time, if the physicians confine themselves to give the patients martial preparations, whilst they would arrive at the cure of chlorosis much better, by reestablishing the normal energy of the nervous system, a condition essential to a good appetite and the sustenance of the regular course of the other functions.

Having said this, we will recall precisely the march which follows the carbonate of soda waters in their physiological effects. By the rectification of the innervation, whimsical tastes give place to good appetites, to a nutrition more complete, and thus from this moment the organization extracts iron from the substances in which chemical analysis, strictly made, has difficulty to discover,

The alkaline waters of Vals are for the most part ferruginous. It may be said they should not be ; but it must not be forgotten they do not act as a spoliator on the blood ; they fluidify and alkalize without depriving it of any of its elements ; better still, they carry a new life, they render it more apt to support their hemato-sical action, they repair and tinge it.

Now having seen that bicarbonate of soda has the property of influencing the digestion and hematosiis, it is only left to see that chlorosis will be more quickly moderated by doses of this salt, given each day, than by antispasmodica and even ferruginous medicines. That is to say that we believe with Petit, of Vichy, in the efficacy of the alkaline waters in nervous disorders. Nevertheless, we say willingly that if the mineral water contains besides, as these of Vals, carbonic acid and iron, the chances of success are notably augmented, as we have often witnessed in experiments at our therms, where we have applied the following rule :

When chlorosis seemed to have but the simple perversion of the innervation, we have subjected the patient to a dose of the waters of the spring *Dominique*. If it were accompanied with serious dyspeptic troubles, and appeared to proceed from irritation, of the abdominal viscera (uterus, intestines, etc.), we have prescribed alkaline baths, and as drinks, the water from the springs of *Rigollette* and *Magdeleine*.

CHAPTER VI.

GRAVEL AND VESICAL CALCULUS.

CATARRH OF THE BLADDER AND STOPPAGE OF THE PROSTATE.

CYSTITIS. — METRITIS. — LEUCORRHŒA.

AMENORRHŒA AND STERILITY.

The lithontriptic virtues of the alkaline waters have been celebrated everywhere; and from the first of June; those possessing calculus and gravel have been sent in numbers to our thermal stations, whence enormous quantities of mineral waters have been sent at different periods of the year.

Gravel is a very common disease, and the utility of the waters of Valsin resisting it as commenced to be generally known. This we say, and the cause of the nature of this affection will justify, that, in resorting to the efficacy of alkaline mineral waters in gravel, the greatest confidence may be confided.

It is known that gravelous urines are filled with grit, of divers colours and consistencies, and composed of inorganic molecules, formed by crystallization or by the mucus.

From the report of their chemical composition, some are formed from urinic acids and alkaline basis, and coincide with urines very acid. Others are constituted by carbonate of lime, sulphate of magnesia and amoniac, or of oxide of lime, receiving birth in the alkaline urines, and are frequently the result of catarrh or other morbid processes.

After this last division, we will remarck first, that, gravels of the first kind, for the most part constituted by uric acid, meet their most favorable pathogenical conditions in gouty diathesis, with which gravel has a great etiological relation, because in these two diseases the striking character is the predominance of anormal uric acid in the blood, and they are found sometimes to coexist or manifest themselves alternatively.

Gravels of the second kind, those formed of carbonate of lime or of phosphate of ammoniacal-magnesia, owe their existence to the decomposition of the urine in the kidney, in the ureterus or bladder, the interior of which, according to the theory of M. Schérér,

undergoes two kinds of fermentation. One acid, produced by the natural mucus passing through the urine, and on which certain morbid conditions would have caused a notable change. Then the matters extractive and colouring of the urines become transformed into lactic acid and this, substituting itself to uric acid, precipitates it.

The other fermentation would be alkaline, and then, always under the influence of the adulterated mucus, the urea would be transformed into carbonate of ammoniac, and would form, by the law of double decomposition, phosphate of ammoniac-magnesia, constituting a great part of the vesical gravel.

Note here, that the phosphate is normally held in dissolution in the urine to the state of acid phosphate or of bi-phosphate, and that if the excess of acid is neutralized in the alkaline fermentation, there is a new deposit of insoluble phosphate of lime.

This theory essentially chemical, though not explaining the formation of all the gravels, appears to us, notwithstanding, to give the reason of a great number; a hereditary influence reserved, which has always, in our observations, appeared to rule the etiology of this disease as that of the gout.

Without doubt it will rest with us to show how certain vesical catarrhs produce a phosphatic gravel almost immediately, and why others are formed in so long a time after or perhaps never. The narrowness of the ducts of emission retain the muco-matter amongst other things, which may perhaps be the reason of the morbid anomaly in the first instance.

The chemical phenomena producing certain gravels, that is to say, the fermentation of the urine exist under the influence of two orders or conditions.

1° The obstacles which prevent the passage of urine, as the paralysis, more or less complete, of the bladder, or the tumefaction of the prostatic gland. Then, the liquid, as if exposed in a vase to the air, and to a high temperature, ferments, decomposes and produces gravel. The catheterism entering more air in the bladder, often precipitates the decomposition.

2° The other conditions consist in the alteration of the mucus, an effect of the catarrh of the bladder. The mucus soon begins to ferment and decompose the urine, and this chemical action is

accelerated by the presence of the matter. The chronical catarrh very often, leads to the consecutive ulceration of the mucous vesical. In this last condition, it is not rare to find in the urines vibrious or bacteries, and matter, productive of ulceration, activating the fermentation, gives birth to those gravels the bases of which is lime or magnesia, in one word to those which may be conveniently called *alkaline gravels*.

The same morbid process may be applied to uric gravels, but this mode of origin is rather rare for them.

With these examples, it is easily to explain the origin and the constitution of calculus. In fact, that under the influence of a general state or of local fermentation, little stones, begin to be formed, these do not tarry precipitate on mucus; and one is always sure to find in the centre of a calculus, whether the mucus itself or the calcareous salts which are its residue. There they settle through the intervention of the intervention of the thick mucus, more coherent, and they form a little mass which serves as core or nucleus, which continually increases until it becomes a large calculus. This by its presence irritates the bladder, promotes the catarrh already existing, produces new stones, which augment the original mass by arresting them.

Sometimes an acid fermentation succeeds to alkaline fermentation, and thus explaining the heterogeneity of these calculus of which the centre is uric acid, and the periphery is composed of alkaline salt.

From this pathogenical exposition (chemical and mechanical) on the formation of gravel and calculus, it may be legitimately concluded they are born now from a general affection, that is to say, the gouty diathesis, and then from an alteration in the locality of the bladder; finally, that to create a calculus of a certain volume, the influence of the two causes is necessary.

Uric Gravel. — In the following chapter, is speaking of the gouty diathesis, we shall refer to several examples concerning the history of the uric gravel, which is often a manifestation. We will remark only that the carbonate of soda waters of Vals, even when not very alkaline, have the power of acting on the uric gravel, in normally disaggregating and diminishing them, and rendering them more easy for expulsion by the natural passages.

We also add those of our waters most charged with bi-carbonate of soda and carbonic acid, such as those of *Rigolette* and *Magdeleine*, are the best, because they possess the greatest disaggregating action; not forgetting, that we have said that carbonic acid was good for biliary calculus, and repeat it again; this gas which disaggregates feldspathic rocks, is it not able to dissolve calculus of urate of lime?

Several cases, observed at Vals during the season of 1866, help us to respond in a strong affirmative. We have even tried several patients who had no faith in our waters and after 6 or 8 days, one or more small stones have been detached and glided in the ureter, thereby proving that the lombar pains can be removed. We give the following example.

OBSERVATION ON URIC GRAVEL.

M. C..., of Lyons, a silk-thrower, aged 38 years, replete, vigorous and sanguine. He has had the gravel for several years, and has had several attacks. Doctor Girin sent him to Vals, where he arrived on the 9th of June.

He complained of heaviness and of pain in the renal region on the right. His tongue was white, without appetite, and bad digestion. His urine was very red, and his pulse at 65.

He was immediately given the water of *Magdeleine* to drink 6 glasses a day and alkaline baths. On the 12th he was under the influence of the carbonate of soda waters. His urines did not appear so acid, but he complained that he did not part with one half of what he drank, because he took the water of *Saint-Jean* besides the other waters.

On the 13th the pain in the kidney became intolerable. Also M. C..., would go away; he would listen to nothing; on the 14th the pain disappeared from the kidney and right testicle, which was greatly retracted; on the 16th a uric calculus the size of a large pea was expelled from the bladder.

From that time the patient became better: his appetite reappeared and his digestion strengthened. He drank 8 glasses a day of the water from spring *Magdeleine*, and he returned to Lyons on the 1st of July in a state of health which lasted to this day.

The excess of the uric acid in economy, may be seen very often at the redness which may be found at the bottom of the vessel they deposit their urine in; this morbid trouble is often accompanied with heaviness in the kidney and with dyspepsy.

Examples are often to be found at Vals; we give one.

OBSERVATION ON SAND URICS.

Doctor Ollier of Lyons sent to us, on the 17th of August, a Mme J..., of Saint-Bonnet-le-Château. She was 54 years of age, and so enormously corpulent that she exci-

ted the attention of every body. The uric gravel may often be found amongst persons who eat much and those who are very stout.

She told us her state and attributed her pains to metritis. An attentive examination soon told us that she had the uric gravel and the sand redness in the urine. During 22 days she drank, night and morning, from 5 to 6 glasses of the waters from the spring of *Magdeleine*, and sometimes more without being incommodated. The tolerance of the gravel was soon manifested. On the 9th of September she left Vals in good condition, and has not ailed anything since.

We could, if it was needfull, increase these observations ; but we will terminate by the following in which appeared alternately the sand and the uric gravel, and in which, on will see a patient, who was sent to us, at Vals, where he found a cure for his uric gravel, after having been unseccessful at other thermes.

OBSERVATION ON STONES AND SAND REDNESS.

M. R..., of Clermont (Hérault), aged 32 years, of a sedentary profession and leading a moral and exemplar life, came to Vals, where he was sent by Doctor Beauclair. His diseases was uric gravel, producing a sand redness and sometimes little stones of which he showed us 3 samples, which were expelled at different times without much pain.

His urines are easy and give a very strgong acid reaction ; the tongue is a little white and the dyspeptic phenomena are very visible. We also observed renale pains.

The patient told us that Doctor Beauclair had sent him twice to Vichy, twice to Andabre, and had also taken baths at a thermal station, the name of which we will not mention . He told us also that these treatments had eased him for the day, but had not changed his position. He seems worn out. We advise him to take the water of *Magdeleine* 2 glasses night and morning, and alkaline baths.

He followed this treatment for 21 days, and augmented the dose alternately, when he had constipation, with that of spring *Précieuse*.

Very soon his urines became less acid, then the acid ceased ; and the sands disappeared.

On the 20th day the cure was complete, his general state was good ; the colour and appearance of the patient at his departure gave every signs of a perfect cure. He did not fear to witness his word in recognizing the lithontriptical virtues of the waters of Vals, according to him they were superior to those of the termes where he had been sent the preceding years.

This is from those who have tried them. It is impossible not to accord to the carbonate of soda waters of our station a large and happy influence, not only in uric gravel, but in those which are the production of alkaline fermentation, and not considering their general points, it may be said that in all kinds, the alkaline medication, above all by the mineral waters, has for effect,

as says Petit, of Vichy, the augmentation and renewing of the urinary secretion, dissolving the mucuous agglomerations and suspending the fermentation. These waters carry undoubtedly, on the catarrh of the bladder, a modifying and preventive action.

If we consider the gravel from a chemical view of their nature, we shall not be astonished to see that the alkaline act directly on those whose origin is found in acidous fermentation, and it will be seen that, in this case, the insoluble uric acid being transformed into urate of soluble soda, by the prolonged use of soda waters, not only do they cure the gravel but, still more, they prevent it.

Phosphate of Gravel. — If the laws of chemistry do not yet lend their aid, to show completely, on the part of the soda waters, a power of disaggregating directly on the phosphatical gravel, experience is there to prove the utility of these waters in the treatment of the alkaline gravel. The modifications they produce then, may be explained by the disaggregating and dissolving property that they have on the mucus, and also by the new character they give to the catarrh of the bladder itself, whether by giving to the mucus a sort of substitutive irritation, or whether, the very gaseous alkaline waters of Vals, act by their carbonic acid on this membrane, in virtue of the proprieties of that acid, recognized to-day, of being stimulating and anti-septic. Concerning the real calculus, without giving to the alkaline waters an exaggeration of influence that one believed good to accredit, we say that the soda waters of Vals, for which we will not again assert their power of completely disaggregating these large and strange bodies, have certainly the effect of happily modifying the state of the vesical mucus, of diminishing the catarrh, which has been the first cause of all, and that accompanies it always, of preventing the calculus increasing to a large volume but all that as an adjuvant mean, without prejudice from surgical operation.

Already, from long time, they have sought by local treatment by a chemical reaction operated on the vesical calculus to facilitate its expulsion, and Dr Bonnet (of Lyon) had even made a remarkable memorandum on this subject.

Even in our days, in England, Benjamin Brodie, Hoskins, and Roberts, have made new attempts on this kind of medication, and the latter employed very strong solutions of bi-carbonate of soda in injections. According to this gentleman, water containing one per cent, of alkaline salt, would be preferable to that which is more charged, and such is, with other proprieties also, the degree of the alkaline saturation of the water of the spring of *Magdeleine* of Vals.

Without pretending to dissolve the calculus by the aid of our alkaline waters, we think, nevertheless that they might be usefully employed in injections, and serve to irrigate the *Eguisier*, said Dr Bouchardat in his last *Therapeutical annual*, and to aid the passage of a double courant.

In all the cases where the calculus has been once parted, this treatment is able to prevent the formation of new stones in the bladder, and the alkaline waters taken as a drink, activate the organical disassimilation, diminish the proportion of the uric acid and the urates, products of an incomplete combustion.

Dr Demarquay, for the purpose of activating this combustion, employed in his treaty the inhalation of oxygen; but he preceded these inhalations with the use of soda waters, so that the blood being rendered alkaline, the solubility of oxygen becomes greater.

Vesical catarrh and prostatic stoppage. — The catarrh of the bladder is very common amongst old men, amongst whom it is often a cause of gravel, whenever it is no effect. When once discovered, it ought not to be neglected; as everybody knows it may lead to a lesion of the kidney or of the prostate. It will suffice for us to remind our readers that this morbid state quickly becomes constipation, and throws the patient into a path which conducts him to marasm; if the carbonate of soda waters be employed immediately, happily the digestive forces will be sustained, the uric excretion will be facilitated and regularized, and by their anti-septic and resolute proprieties, usefully modify the vesical mucus.

The stoppage of the prostate is ordinarily very difficult and rebellious; its treatment by the waters of Vals is, nevertheless, remarkable, particularly by their resolute proprieties. It often leads to happy results. By the variableness of the passage which influences the hypochondriacal state of the patient, by the amelio-

ration that the water performs on the digestion, a sort of pivot of the health, and, in diluting the urines of which they facilitate the discharge. These waters are yet very useful in preventing or curing the vesical catarrh, an almost inevitable consequence of the stoppage of the prostate.

Chronical cystitis. — What has preceded applies equally to chronical cystitis, and one may also deduce the therapeutical influence of the carbonate of soda waters of Vals in this disease, from all that has been written on alkaline waters since A. Fabre, and Dupasquier, down to Mssrs Petrequin and Socquet. These learned doctors say in fact: « By the employment of alkaline waters the urines have a tendency to become more abundant, and limpid. One may remark often the diminution and later the disparition of the mucus that the cooling or repose developes. They may also see disappear the lacteritious sediment which they present when they are very acid. Finally they lose their colouring elements, cease to deposit mucus and acid, and pass to a neutre state which finishes by becoming alkaline. »

Metritis, leucorrhœa, amenorrhœa and sterility. — We shall again quote some passages from Mssrs Petrequin and Socquet, to edify the reader on the influence of carbonic soda waters in the different morbid states. They say in their excellent *Traité des eaux minérales*: « Amongst women, the alkaline waters exercise a complex physiological action on their uterine system. They diminish their catarrhal secretions, and we find the same original result for the leucorrhœa.... When in menstrual troubles, whether it be chlorosis or stoppage of the matrice (Dr Villemain), they are advantageously combated by the same springs.... It is without doubt from this assemblage of circumstances that they may favor the impregnation, and it is to this point of view that they may be preconized against sterility. »

Of this last proposition, if it had been advanced too absolutely, it would be useless, we believe, to observe that we decline the responsibility. Still we say that if it is not spoken of congenital and also organical sterility, but of infructibility from an acquired cause, we have observed, from long time, eventual cases of sterility cede to the use of Plombières water, and, to our knowledge, the same fact has been repeated by the water of Vals, employed as drinks and baths.

CHAPTER VII.

GOUTY DIATHESIS.

As in other morbid lesions with regard to etiology, the history of gout reposes on uncertainty and obscurity, however, since Hippocrates this disease has been observed, studied and described by many nosographists.

One grand step, however, seems to have been made in our days, relatively to the cause of gout; and it has been given, as an explicative lesson, the presence of uric acid in the blood in excess (Garrod).

It will then no longer be, as in the time or reign of the theories of the school of Broussais, considered at the result of an inflammation of the articulations; nor with Chomel, shall we endeavour to discover whether gout and rheumatism be the same affection varying only in the form and seat of its manifestations.

Erasme has called it the sister of gravel, because it has long been observed that the gouty are subject to a sort of gravel (uric) and *vice versa*.

One knows the atrocious pains of which complain from the moment of its access, the people attacked with gout, the divers symptoms which accompany it, the tophaceous concretions that are sometimes left in the articulations, where is revealed its existence. What is known to-day of its pathogenical conditions?

Nothing different, only that it appears to depend on an hereditary predisposition and that it prefers to attack those who are given to excessive living, and to very sedentary occupations depriving motion and exercise.

With these data one of which is valuable (excess of uric in the blood). They have formed the following theory to explain the gouty diabetes, and have said : « That it is constituted by an excess of nutrition in one part and the want of assimilation in another.

In fact, to entertain the normal life, it is necessary the double work, on which subsist the alimentary substances, must be equalized, that is to say, that the new molecules, carried in the tissues

to form part, or *assimilation*, be in correlation of exact quantity with the departure of the ancient molecules, to say otherwise, with *disassimilation*.

Disassimilation has for its principal element the formation and excretion of an azoted principle, of the urea or better of the uric acid. Now, if the assimilation has the mastery on the loss, that is to say, if it produces there an excess of uric acid by making a nutrition too copious or too succulent, and the disassimilation be more than compensated by this too substantial alimentation, by nutritive drinks, such as berr, wine, etc., it is very natural to find, in normal proportion too great, the uric acid in the blood of the gouty, in their skin, and every other articulation, where it constitutes tophus, in combining with lime and soda.

To this theory, it is objected that there are much more gluttonous than gouty. In fact we are far from admitting that sumptuous living is the sole cause of gouty diabetes, but only so as determining the exposition of a morbid state, powerfully dosed in an hereditary organism predisposed.

Amongst gouty persons, uric acid may be found not only in the blood and the tissues of which we speak, but in the renal glands, in the urinifery tubes of the pyramydes, as resort of the works of Garrod and of Cornille, and particularly of the researches, of which the last-named has consigned the results in the work that he published on the gout, in 1865.

From this fact, it can be understood what kind of connection is believed to be recognized between this disease and gravel, since for this last as for the gout often, by the excess of the uric acid in the economy, the uratic concretions, developed in the interior of the kidney, become detached, then descend by the ureterus into the liver, where, besides, by their irritating contact, they give place at first to a catarrhal state and soon after, to the formation in this place of a new local gravel.

After this court digression on the gravel, we will enter again on our subject in saying that it is somewhat established that the gout is the result of a disproportion between the nurture assimilated and the urea excreted; and we add that the pathology of this affection leans on this physiological theory.

In many instances the gouty may be seen acting as if in good health, so soon as a gouty access is over. The reason is that the pa-

tient receives a violent ague which augments his losses, because, all the doctors know, in the febrile state, the respiration and all the other functions divested accelerate. Show us the benefit of this act in the particular case we now speak of and we will admit a rapid elimination and of the proportion exceeding the uric acid, we shall see there also, that, in a certain measure, the ancient opinion of the criticality of the gout is sufficiently founded.

Nature the best of guides, thus shows us the way to follow in the medication of the gout ; to excite disassimilation by exercise, and, besides, stop the excess of nutrition ; such are the two pivots on which repose the therapeutics of this diabetes, and, to fill the first indication by an other process, Cadet, of Vaux, advised, drinking water in large quantities, half a glassful every half hour. This means, which augments the quantity of urea excreted, constitutes for this medicine, the treatment exclusive of the gout.

The exercise, has on this point, a great importance ; because it accelerates the circulation and the respiration and thus allowing the nutritive elements, which pass through the blood, to activate the excretive organs, the true agents of disassimilation. We would remind our readers here, that we write on a therapeutical point of view of the waters of Vals, and say, all in accepting willingly the other medicinal and hygienical means proper to fulfil the two medical formula above, we have often found in the alkaline waters of Vals, above all in the temperant (*St-Jean*) sometimes in the laxative (*Désirée* and *Précieuse*) a means of diminuting, by their anti-plastic proprieties, plethore, an effect of excessive nutrition and the cause of gout.

In its course, this affection shows us other particular actions which we plead in favor of our waters. First, the gouty diathesis, which, during a certain time, only manifests itself by acute agues and only appearing at long intervals, later becomes irregular or chronic, and the accesses, if they have not more intensity than, and remain in the same place as, those preceding, are forerun and announced by the premonitory symptoms of dyspepsy for the most part, a consideration very important for us.

In this second phase of the gouty diathesis, the waters of Vals

are very useful, in calming the immediate symptoms and preventing fresh accesses.

In a chronical state the gout has a tendency to pass to a third period, in which a debilitating therapeutic would be injurious. The patient becomes languishing, feeble and thin because their digestion is dormant. In this state of prostration, the pain influences their moral, faculties, and they are soon hypochondriacal. This is a veritable gouty cachexy, and then, all in observing the regime the moment has arrived for using tonics and giving reconstitutive alkaline waters, those of *Magdeleine* and *Rigolette* for example.

We resume then in saying that the alkaline gaseous waters of Vals are indicated for the three different degrees of this disease.

1° At the first period, the temperate (*St-Jean, etc.*), by their anti-plastical qualities and from the great quantity which may be taken without inconvenience to the patient.

2° In the chronical period, the laxative, because their qualities act on the intestines and influence the urinary secretion, and also that they favor digestion.

3° Finally, in the last or cachectical period, the tonical and reconstitutive waters *Magdeleine* and *Rigolette* which possess iron, chloride of sodium, and above all, the altering and renewing proprieties of the alkaline gaseous waters.

If we add to these means a proper regime, moderation in the use of wine, beer, tea, and coffee ; entertaining the muscular activity, and endeavouring to be mirthful, we shall have fulfilled those indications reclaimed by the therapeutic of the gout, and they will find at Vals all that is necessary to obviate the effects of a diathesis profoundly rooted in the economy, to render the manifestations more rare and hinder those that are already too prejudicial to the health. The following observation will substantiate our assertions.

OBSERVATION ON GOUTY DIATHESIS.

Mlle Saint-M..., of Lyons, aged 50 years, was sent to us by Doctor Chassagny. She was under the influence of a long-standing gouty diathesis, as well as, she said, her mother and grand-mother.

Two articulations of the right hand (the annular and the forefinger) were swollen and painful, and appeared to be, what was called, in Lyons, a new rheumatism. For two years the great toe of the left foot had been red, painful and swollen.

in one word it was a true access of gout. Then she did not present any phenomenon but slightly dyspeptic from febrile reaction. There was only a general feebleness and very sensible articulations of the right hand which was swollen.

She commenced her treatment on the 15th of June, and took the water from the spring of *Rigolette* four glasses a day, and a mineral bath, during the time she was there.

On the 19th we substituted the water of *Magdeleine*, and, being submissive to our prescriptions, she took ten glasses each day. After several oscillations, good and bad, tolerance became established. On the 30th of June, she took an immediate distaste for the alkaline waters, even the least mineralized. We suspended the treatment for two days, after which she commenced again and continued until the 12th of July. She found notable ease, because to this term the pain had disappeared, and the swelling of the articulations had greatly diminished.

We may ask with our excellent confrere Dr Chassagny : « Is the gouty diathesis of the malade sufficiently combated ? That is left for the futur to reveal ? The general state is excellent for the moment, and it is as we believe, all what we may hope for from a first season at Vals.

CHAPTER VIII.

CHRONICAL RHEUMATISM IN GENERAL.

Gout, as we have said, is much confounded at present with rheumatism : these are two distinct diseases, but the pathogenical conditions of the last are more obscure than those of gouty diathesis. It has been a serious study of a great number of celebrated physicians, the anatomical-pathological researches of which have made known the results of the disease, without discovering much of its etiological nature.

From the acuteness of the pain, from its sudden and sometimes periodical returns, rheumatism shows a certain analogy with gout ; as this, by its position in the articulations, its sudden manifestation when subjected to cold, recalls what has been felt by a person when affected with rheumatism. Finally, their symptoms sometimes transported from one organ to another make us to adumbrate, the pre-existence of a morbid state in the affected subject, gives to them a certain resemblance which pathologists soon reject, when they study and compare the anatomical alterations produced by rheumatism and gout.

Thus, between these two morbid states, the points of similitude do not exist but in their appearance and their secondary symptomatical expressions, and, whilst the gouty diathesis is characterized by the presence of uric acid excessive in the blood, this offers, in rheumatism, an abnormal plasticity and a considerable augmentation of its fibrine, as shown by the analysis of MM. Andral, Gavaret, Nasse, Simon, Rodier, etc.

By its character of relapsation and several of its symptoms, rheumatism appears to attack, ordinarily, a constitutional state, an opinion corroborated from the opinions of a great number of authors, who admit an hereditary predisposition ; and in his excellent lessons made at *la Salpêtrière* Dr Charcot, says, in fact, that this disease relies very often on hemorrhagical diathesis.

When to the occasional cause, Sydenham, Boerhaave, and almost all the physicians have recognized it, as a fact of observation, that in the majority of cases, the invasion of rheumatism is preceded, on all the body or on the painful part by prolonged cold, received either from frost or rain.

Without staying to retrace the different manifestation of rheumatism, since we only mean to study here the therapeutical point

of view of the alkaline waters of Vals, we will only give a few examples of the morbid disorders that it produces, and against which the thermal treatment has always relieved and in many instances cured.

Anemy follows the invasion of rheumatical ague. This phenomenon, particularly noted by modern physicians, is equally as strong in this as in the state of sub-ague (Dr Charcot), and we remark that anemy exists, for a stronger reason, in the chronical form, and may lead to a state of cachexy.

A too plastic blood nourishes badly, we have said, in our commentary on the mineral elements of the alkaline waters of Vals, therefore it engenders diseases and finally anemy. Thence it is but rational to apply to bi-carbonate of soda, to our alkaline gazeous waters above all, to render the blood normally fluid, and secondly, to profit from the stimulating and reconstitutive effects of hydro-alkaline medication.

We have had occasion to put this percept into practice, even in the rheumatical ague, and we have treated it by our most mineralised soda water, those of *Désirée* and *Magdeleine*. They have answered to our desires, in procuring happy and prompt results for the patient. We have no fear of provoking, by this medication, metastasis of a morbid manifestation; better still we have hope that it will prevail and succeed. We have even, a little later, learnt with pleasure, that distinguished practitioners have equally obtained good results from the employment of bi-carbonate of soda when rheumatism has appeared in the form of ague. By the waters of Vals (*Désirée* and *Magdeleine*), we give 10 to 12 grammes of alkaline salt every 24 hours, and we have obtained in 5 or 6 days the relentment of the pulse, descending from 120 pulsations to 80 per minute (*Gazette des Hôpitaux*, 29 th may, 1866) whilst Dr^s Jacoud, Vulpian and Charcot, have administered from 20 to 40 grammes on a day, and the (English) Dr^s Golding, Bird, Dickinson and Garrod, have even given 40 and 50 grammes.

Thus they have proved, as we have by the employment of the waters of Vals, diminution of pain, slackening of the pulse, and consequently, the abatement of febrile heat.

Is it then imprudent, as the fear of some physicians would lead us to think, to administer in the three forms of rheumatism alkaline waters as drinks. and particularly in the chronical form,

thereby opposing the progress of strong anemy or menacing cachexy ?

If, on the other part, we carry our attention to the changes, evinced amongst rheumatics, of several secretions, we find the saliva acid ; the sweat being more acid than in the normal state, more than in the gout itself. The urines contain uratic deposits. The abundance of colouring matter that this last secretion presents, seems to indicate (Dr Charcot) the destruction of the globules of blood ; the urine is also less aqueous and encloses more of the urea than in the normal state ; which tends to give more quickly to the disease the anemical character ; and finally the serosity opening in the pericard and articulations are also acid. If the *contraria contrariis curantur* has still something true, it is in rheumatism that we must employ alkaline gaseous waters, and to rely on their proprieties, as being able advantageously to rieties the general debilit of functions and to alcalize the secretions.

A recent opinion, of English origin, explained the particular phenomena of rheumatism (heat, pain, and swelling in the tissues attacked) by the following hypothesis ; the lactic acid forming by the disassimilation of the fibrous tissues, and being produced in excess, deposits itself in the organs and gives to rheumatism these distinctive characters.

This theory would be exact, which the learned physician of *la Salpêtrière* put it in doubt, or rather the affection would present, in its immediate effects, the existence, in the blood, of several strange matters to the constitution of the nourishing fluid. In this case as in the other, the bi-carbonate of soda waters of Vals, would be the best means of with standing, not only the rheumatical [manifestation (pain, heat, and swelling), but also ther general consecutive anemy.

We have seen in fact that bi-carbonate of soda has been administered with success, however small or great the dose, even when there has been an intense febrile reaction, pain, and all the other symptoms of the period of ague. It is evident than in the chronical form its action will be still more favourable, particularly if it be given in drinks, diluted in a natural mineral water, and if, at the same time, one adds the resolute influence of the alkaline bath.

Almost all the mineral waters have the propriety of exciting

the functions, of the skin, and this is the reason why they are so successful in rheumatism. But the alkaline waters carry their influence to the profoundest tissue, modifying the humours and, we may as well say, attacking the diathesis and by changing the general constitution, obtaining more durable effects than any other hydro-mineral medication, which directly addresses itself to the local morbid manifestation.

It is not rare to see soda water, taken either as a drink or as a bath, search the evil even into the roots of the original symptoms of pain. This phenomenon, indicates the commencement of a reaction very useful to the cure. It also affects the organ specially attacked in preference.

Much time has been spent lately in showing the metastatical relations between blennorrhagical urethritis and rheumatism; they know that the last shows others, and that, real Protheus, it sometimes changes the forms of its manifestations, it also transports the scene of the organs of relative life on those of the animal life. We shall, however, speak of it in the following chapter, when it shall be the question of the catarrhal state. Without staying to describe the symptoms, so numerous and various in rheumatism, we shall consider it here only, as we said at first, on the point of its treatment by alkaline waters, and we will give one of the numerous examples sent to us at Vals, in which the disease, by a reflex effect has brought trouble in organs, very far from those in which it first arose.

OBSERVATION ON VISCERAL RHEUMATISM.

Mme L. R..., aged 48 years, strong and replete, she was occupied in a work, where she was exposed to cold winds and dampness. She suffered from rheumatism, and had been but little soothed from a thermal treatment she had made at Vichy during two years.

On her arrival at Vals, where she was sent by Doctor Bossu, of Lyons, she was pale, anemic and somewhat corpulent. Her tongue was white, the digestion very bad, and diarrhœa was frequent. Rheumatism did not manifest itself on the legs, which are its ordinary election.

The belly was a little obese, it did not show any grave alteration, but the stomach was a little sensible. A touch of diarrhœa, as we have said, is one of the morbid phenomena predominating; consequently we prescribed 4 1/2 glasses morning and night of the water of the spring *Rigolette*, and alcalino baths. This dose was augmented as the stomach supported better. This treatment was followed for 22 days, at the end of which she was able to return to Lyons, showing no sign of dyspeptical

rheumatism. The stomach had its proper functions and the anæmy had, from the medication, disappeared.

Accordingly the rheumatism had rested by the digestive organs, making the pains appear around the malleolus, where they felt vive, but sitting because she was not entirely freed until after some days. Since then the dyspeptical rheumatism and other symptoms which had brought her to Vals, have not appeared, a fact which we learn with pleasure from our colleague Doctor Bossu.

When we look at the almost indefinite number of prescriptions for the affection of which we speak. The drugs which are ineffective or of but a short duration, and which constantly leave on the patient a fear too well founded, of relapse; when, one may still say, as in the time Scudamore, that the experience of our time did not offer any certain remedy for rheumatism, and finally, when one now sees that the physicians avow that this disease is almost always rebellious to the means of the most methodically employed art, one remains convinced that its treatment by alkaline waters is still, above all, the wisest and most rational.

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DOMINIQUE SPRING.

2

THE SPRING DOMINIQUE

(Second kind of the waters of Vals. — Acid ferro-arsenical water.)

CHAPTER I.

SITUATION. — BEGINNING. — ORIGIN. — MODE OF MINERALIZATION.
CHEMICAL QUALITIES OF THE WATER.

On a plain, beyond a little picturesque and verdant valley, enclosed on the east by high mountains covered with vines and tall chestnut trees, gushes out the spring *Dominique*, little known three centuries ago. A solid modern edifice, whose exterior embellishment, formed of materials obtained from the neighbouring volcanoes, indicates the nymph's cave. To arrive there, one must climb, but without effort, the declivity being gentle, an ascent of 187 metres, above the last and most high alkaline gaseous springs of *Rigolette* and *Desirée*.

It was from a preacher of the order of the Dominicans that this spring received its name. He lived in the 17th century, and had long been afflicted with a fever which had almost produced a state of marasmus, and on whom this source wrought a wonderful cure.

From this time, Geoffroy, Buchoz and all the authors who have written on the mineral waters of Vals, have expressly mentioned the spring of *Dominique*. They even spoke of it in preference to the ancient *St-Jean*, probably because of its rare and singular qualities: but whether it be anterior or contemporary with the other ancient springs, it nevertheless has an age as respectable, being no less than three centuries old. Its reputation it is true, is not so old, yet, it has won its name by the wonderful cures it has made and from the confidence of the physicians it has gained.

At first, the water of the spring *Dominique* was used with a certain hesitation, because they believed that it contained vitriol and copper. This half error (it contains sulfuric acid but no copper) did not prevent its being used to collyrium for the disease of the eyes, and also to apply it to old and sordid wounds, with a view of cleaning them and activating their healing.

They also took it as tisans, and, from the year 1774, Vincent Raulin recognized and *did not forget to write* that one had, already for a long time, administered it with effect in intermittent fevers, and that he considered it was justly entitled to be used as an excellent febrifuge and anti-periodical remedy.

The existence of an acid spring is not an anomaly in nature; several are known, and all equally situated in the neighbourhood of volcanoes, and containing in their water sulfuric acid and salt of iron. M. Guibourt, in his work (*History of simple drugs*), says the river *Rio-Vinagre*, in America, contained free sulfuric acid, but it is nothing like the complex waters of the spring of *Dominique*, which preciously combines iron, sulphur, phosphate and arsenic, and in this respect stands alone.

It seems difficult to explain the presence of this acid spring amongst other alkaline springs. The astonishment will soon cease if it be considered that it comes most probably from the massive mountains, which are a continuation of the Coiron, whilst the carbonate of soda waters seem to come from those at the right of the Volane, under which they pass by a sort of tunnel, syphon, or other natural conduct, to gain the left shore of this river and issue not far from the spring of *Dominique*. The inspection of the country and the opinions of distinguished geologists, authorize to admit, for these two kinds of waters (alkaline and acid), that they may have different origins, notwithstanding the proximity of their point of emergence.

There are to be found in great abundance, on the borders of this spring, stones of different natures. They are principally grayish, greenish, or with argentine foils, micas, silicates, sulphur of iron, and, in fact, other pyrites. It is so on the mountain from which the water of *Dominique* springs, and this may explain its chemical composition. On the feldspathical and micaceous rock where this spring is secreted, may be remarked large spots of a greenish yellow which may be attributed to the green of Scheel delayed by

the rains. These are in fact the arsenical pyrites which become dissolved by the waters, which filter the massive mountains west of the Coiron, and from where they carry their attribute of arsenical salt to the spring of *Dominique*.

The other pyrites equally decompose, either by the influence of water or, better still, by the dissolving action of sulphuric acid which is formed in a proportion sufficient to dissolve the rock, and in their turn pyrites the most resistant. From the lixiviation of the feldspathical rock the chemical reaction which accompanies and favors it, results the mineral water of the spring *Dominique*, of which the qualitative analysis, made Mr O. Henry, gives the results shown in the following table :

In 1000 grammes of water may be found :

Sulphuric acid.	1.76 Grouped thus	Sulphuric acid.	Sesquioxyd of iron.	1.30
Arsenic id.		Silicate acid.		
Sesquioxyd of iron.		Arsenical acid		
Lime and soda		Phosphate acid.		0.44
Silicic acid		Sulphate acid		
Chlorine.		Sulfate of lime		
Phosphoric acid.		Chloride of sodium,		1.74
Organical matter.		Organical matter		

The water of the spring of *Dominique* marks 14 1/2 degrees on a centigrade thermometer. It is clear, limpid, its taste slightly acid and chalybeate, but not disagreeable, because the majority of the patients drink it with pleasure. It issues from two principal apertures which it has slightly opened in the rock. The captage has been artistically arranged, and two taps supply the consumers, or to fill the bottle they bring with them.

The physical qualities of this water, particularly that of refreshing, and the cure they see each day made by it, draw to this spring (*Dominique*) a great number of patients who would drink of it, notwithstanding the contre-indications. We are then obliged to fight against this disobedience and obstinacy, and also against the imprudence of those who drink water without measure : 8 glasses a day, are already a very strong dose, because, though this water is very digestible, sometimes very useful for certain dyspepsies to dry or stay a depression of the innervation, it leads to diarrhoea, when they use it abusively ; this obliges us to suspend the treatment for two or three days.

On inspecting the table of the component proprieties of the water of the spring *Dominique*, it will be seen at once that it ought to have a profound and energetic influence on economy. The multitude of observations made by us, as much at Vals as in our practice at Lyons, and of those published by our colleagues, have legitimated this induction. They have proved to us that the curative result is due to medical agents with different proprieties, but not otherwise, thereby permitting the water of the spring of *Dominique* to be applied with success, in the treatment of the numerous and grave affections, of a varied nature, and of which we shall speak soon.

CHAPTER II.

GENERAL IMPORTANT THERAPEUTICS.

THE MINERAL ELEMENTS OF THE WATER OF THE SPRING DOMINIQUE. THEIR ACTION ON ECONOMY.

To give some idea of the importance and the reality of the medical effects that may be derived from the use of the water of the spring *Dominique*, it will suffice to draw together what has been presented by the physicians we have written, in late years, on the waters of Vals. The waters of *Mont-Dore*, in Auvergne, contain several atoms of arsenic, from which it is concluded that they have good influence in certain diseases of the chest. Again, Mrss Imbert-Goubert and L'Héritier attribute to one milligramme of arsenic, contained in each quart of thermal water, the curative proprieties of the springs of Plombières.

Now, Mr O. Henry has estimated at three milligrammes $1/10^c$ per 1000 grammes the quantity of this mettalloïd dissolved in the water of *Dominique*; good manners and logic dispense our saying more on this subject.

Besides arsenic, we have seen the second class of our waters of Vals contains, per quart, 1 gramme 30 of free sulphuric acid, phosphate, silicate of iron, etc. Each of these substances of which it is composed, has by itself or by its derivatives, physiological and therapeutical influences on organism, and ought to be ranked amongst the most powerful modifiers of the economy.

To study separately the physiological actions produced on organism by the mineralized elements of the spring *Dominique*, is to make a kind of preparatory analysis, destined to avoid later, to repeat details, when we speak of their therapeutics. We will then continue the path that we have already commenced, in the examination of the alkaline gaseous waters of Vals, and will call, at first, several opinions of authors, the most worthy, on the effects of sulphur, silix, phosphorus, iron and arsenic, which may be produced on economy, when they are introduced in small quantities, diluted in a mineral water.

SULPHUR forms a part of our tissues, of the bones particu-

larly, where it exists in the state of sulphate of lime. In the economy, its part is to revive the vitality of the tissues, to stimulate them in their functions, altogether furnishing the elements of nutrition. It can then be conceived why it is advised in catarrhal affections, as also in rheumatism; it is this, in fact, which constitutes the most precious medical agent in the mineral waters employed in several thermal stations against these two affections.

This metalloïd is a destroyer of the epigenetical products of the blood, and in consequence, one of the most efficacious remedies against diseases of the skin, of which it re-establishes and revives the functions; in animals particularly, the fur become so nice, thick and glossy when they mix sulphur in their aliments. The therapeutics of the dermatosis would be also considerably restrained in their formula and diminished in value, if they withdrew sulphur.

In the water of the spring of *Dominique* sulphur is at the degree of sulphuric acid, but greatly diluted (1 gramme 30 per quart), as in the pharmaceutical preparation known under the name of mineral lemonade, often employed in medicine to moderate grave hemorrhagy. Sulphuric acid, has the property of augmenting the plasticity of the blood, and also, according to Mr Gubler, becomes an agent in furnishing, as its radical, sulphur, the elements of nutrition to the tissues, and in stimulating them in their vital actions. Finally combined to iron and to lime, it preserves and augments its altering and reconstitutive properties.

SILEX is not employed in medicine, and yet its part in animal economy is perhaps more important than is generally believed. In the state of acid silicate of iron, it is soluble, and as such, it can be found in the water of *Dominique*. In the stomach, it abandons the iron to furnish the silicate of soda, which, from the experiments of Dr Pétrequin, powerfully contributes to alcalanise the urines.

According to other observers, the silex and the silicates have a therapeutical action against gouty and gravelous affections.

PHOSPHORUS, assulphur, furnishes two materials to the nutrition of the tissues, above, all to that of the bones and the nervous pulp. In the water of the spring *Dominique*, it exists in the state of phosphate of iron, employed at present as a good re-

constituting agent, and which has made in this condition the success of the sirups of Mrrss Robiquet and Leras, sirups which are advised for rachitism, scrofulus and prodromical tuberculose.

In the stomach, the phosphate of iron submits to the first decomposition, in abandoning its base, which combines with lactic and chlorhydric acid, to pass in the general circulation to the state of lactate of chlorure of iron, while free, the phosphoric acid, the real organical element, is itself carried in the economy, where it plays a two-fold part of aliment and of medicating substance.

The water of the spring *Dominique* has, we said, appeared to provoke amongst several persons a sort of rousing of the genesical function. This elective action, is due to phosphor or to the assembly of the tonical elements that this water contains? We should incline towards the last of these two hypothesis, if the fact were quite proved to us.

IRON. — In analysing a vegetable, said Mr Ville (Agricultural conferences) 14 elements will be found, of which 13, taken separately or together are not sufficient to produce a normal plant capable of *bearing seed*. It is undoubtedly necessary to add azote, which only enters in the vegetable composition to the degree of two per cent.

An analogous remark may be made of iron, in concern with animals having red blood. What effect do we see when there is a relative default in the organism? The tissues become discoloured, a general feebleness, and perverse innervation prevails, in one word, there are functional disorders which correspond exactly with those that prof. Ville has proved in the vegetables deprived of azote. Providence has also expanded every where this material element, indispensable to normal life, and which is found in almost all alimentary substances.

All the physicians know too well the grave pathological accidents, ordinary results of a notable diminution of iron, which ought to exist in the circulatory torrent of blood, for us to recall with details, that it is one of the points of the departure of the chlorosis, anemies, leucocytemy, nevrosis, scrofulus, and other numerous morbid states. They know also that it is not, from the non-existence of iron in the material of alimentation, that the blood has been deprived of it, but more so because the pathogenical

conditions pre-existent are opposed to its assimilation, and reject it out of the economy.

It is still generally admitted, that the rational therapeutical indication is not to give iron, in large proportion, to the patient of whom the blood is deglobulized, but to administer a little at a time, under a form and in a condition which render it assimilable with facility. It is well known, to assure the success of the martial medication, it is necessary to find in the same time, by appropriate means, a remedy for one of the first causes of all the disorders : the difficulty of innervation, because from this comes effectively the perversion of the assimilating functions.

Thus to admit iron in the blood, the first condition is then : the calm reestablished in the nevropathical state, which, in most patients is retentive, whatever be its point of departure, from the digestive organ. The second, it is that the iron is dissolved, or, better still, that it finds in the stomach, in the gastric juice where they exist normally, the lactic and chlorhydric acids, by which they ought to be transformed in lactate and chloride of iron. In fact, the recent experiences of Mr Mialhe have confirmed, that under these two states, the metal is admitted into the intestines by the absorbing vessels of the stomach, and it is also under these two forms that it answers, much better, to the exigencies of the hematosical function.

Administered in little doses, and absorbed, a medication may attain the object that is proposed ; it uselessly fatigues when given with profusion, but rejected. This elementary truth, admitted to-day by most physicians, seems to commence a reaction in favor of the diminution of the doses of remedies. Nevertheless, iron is often employed abusively in medicine, as is shown in the studies and experiences of prof. Cornelian (of Pavy) and in which he concludes that a small part of iron may be absorbed, whether it be the quantity given to the stomach at one time.

Consequently, giving little, but in convenient assimilating conditions, thereby, leading to the integrity of the digestive functions, are the rules which must be followed to obtain from iron all that is wanted in chlorosis, anemy and other affections characterised by the diminution of the globules of blood. This double indication is fulfilled, as we have already said, when they give iron naturally diluted in gaseous alkaline waters ; because

it is installed in the stomach in a state of bi-carbonate, and forms soon, from its protoxide origin, lactate and chloride of iron, necessary to the acts of the osmosis.

When the water of the spring of *Dominique* is activated in the stomach, it forms analogous phenomena. Silicate, phosphate, arsenicate of iron etc., decompose and while their acids are carried to other basis, the protoxide of iron, being free, combines with chlorhydric and lactic acid, thus undergoing the transformation necessary for its admittance by the chylous vessels, and conducted through the great circulation of the blood at first, then in the lungs, where, from its contact with the air, it completes the important modification by which it becomes a vital element of the blood.

ARSENIC is one of the most precious therapeutic agents in the water of the spring *Dominique*. It is there found in the state of arsenicate of iron and if even, and that is sure, it would be decomposed in the stomach, its elements constitute one of the valuable remedies in the treatment of numerous affections.

Almost all poisons have, in effect, we say this for the patient and not for the physician, a salutary physiological influence, very powerful on the economy when administered in proper proportions. Arsenic is no exception to the rule ; its action on the organism, shows, when studied with care, that if judiciously employed it may produce great therapeutical results. This medical agent, occupies a great place in medical practice, notwithstanding the fear its name draws forth.

It is curious to read what has been written on the effects obtained by arsenic. In certain countries, it is administered to give stoutness and vigour to man, and to horses a shining coat and easy respiration. Mrss Trousseau and Pidoux, in their excellent work (*medical matter*), forgot nothing on this subject, and have insisted on the action of arsenic in the functions of the lungs, particularly in the respiration, which it facilitates in a wonderful manner.

In order that the water of *Dominique* may be appreciated in the treatment of several diseases, we will only say a few words on arsenic contained in several medical reports.

Mrss Schmitz and Brett-Schneider have observed from divers experiments, that this metalloid diminishes the combustion of

the grease, slackens the movements of decomposition, and renders the exhalation of carbonic acid by the lungs and that of the urea by the kidney much less; that is to say that it stops the loss of the forces and tends to fatten; in one word, that it is reconstituting.

It may still be employed in the nervous system as a sedative, and we have often observed, that, given in small doses, (2 drops a day of the liquor of Fowler, for example) it diminishes the morbid sensibility of the stomach, and produces appetite. Fowler, Pearson, Dr Boudin, and numbers of other distinguished practitioners, have obtained excellent cures by the employment of arsenic in rebellious visceral neuralgia, neuropathy of the heart, intermittent fevers, in fact in all the ordinary complaints that physicians daily meet with, leaving no doubt of the sedative action this medical agent has on the nervous system, and also on the mysterious phenomenon of certain periodical diseases. Thus, with several authors, arsenic gives stoutness, force, and easy and expanded respiration; with others, it provokes the appetite and calms neuropathy. These effects though different do not contradict each other, because morbid irritability, in suspending the normal play of the functions, prevents the augmentation of the vitality by depressing its energy. We have not as yet said that arsenic possesses another and very precious propriety. In acting on the hemato-poietical glands and on the blood, (Mr Gubler), in purifying it (if we may use this expression), in rendering impossible or destroying the generation of epigenetical products (Mrrss Trousseau and Pidoux) in the humours and tissues, arsenic merits, as an altering and anti-diathetical remedy, the confidence of the most distinguished dermatologists.

The micographical study of the morbid alterations has been for a long time at the order of the day, and it promises to the art of healing brilliant and fertile discoveries. It also augments the importance of altering medicines; because it is without doubt that new principles in the blood, without analogy in economy, are, as says Prof. Andral, frequently the cause of diseases, of which the nature is unknown; and arsenic, they add, is an excellent means of treatment for them, slow, it is true, and at long intervals; as all antidiathetical medications that are necessarily given in small quantities and at long time; but it is rational to

employ it in medicine, since, being introduced in the humors and tissues, it makes the parasite and destructive products disappear.

We again resume ; if arsenic given in large doses is a violent poison, given in small quantities, as in the water of the spring of *Dominique*, it is as beneficial and no more dangerous than phosphorus and iodine contained in the oil of fish.

We repeat that, studied from different points of view, it shows, to the most attentive observers, gifted with four very precious proprieties, viz : sedative to the nervous system, anti-periodical, altering, and finally a powerful agent in reconstitution.

In the divers and profound physiological and therapeutical modifications produced by the mineralized elements of the sulpho-ferro-arsenical waters of Vals, there is neither antipathy nor antagonism, and the effects of one do not destroy those of the others ; on the contrary, these medical agents appear to aid each other in obtaining the same result : Health, by procuring to organism, the purification and reconstitution of the blood ; the equilibrium and calm to the nervous system, a greater facility in the respiration, slowness and amplitude in the rythm of the pulse, and as several authors say in speaking of arsenic, the restauration of colour, forces and stoutness.

Yet, whenever an enorgetic remedy is required, it must be first ascertained if there are any counter-indications, and very often the consequence of the examination allows the combination of this heroical remedy with othersubstances capable of tempering its effects.

It is also for this reason they sometimes mix with it opium, iodine, mercury, quinine, etc. We, according, have sometimes hesitated to administer the tonical mineral waters of *Dominique* to persons of a delicate appearance, but it is very remarkable, when the fear of them has vanished ; it is in these very circumstances, we have often been successful. The constitution of the patient seemed to progress with gigantic steps ; the calming and moderating action of the arsenic checking, without annihilating, but in just limits, the action of iron and sulphuric acid.

The water of *Dominique* carries with it its moderator, arsenic, that is to say, it is rarely counteracted. Nevertheless, it is known that when the diet is indispensable, when the febrile state is intense,

when the hyperemy is active or the plethorical constitution very severe, it is not to the spring of *Dominique*, so eminently tonical and reconstitutive, that they may seek succour.

If one will remember the physiological actions influenced by its elements, this water, alone in its kind, leaves to be seen *a priori*, from its chemical composition the morbid lesions that it withstands with success, and clinical experiments confirm what, by hasard or by induction, was known of its therapeutical proprieties.

The physicians of Vals have almost always found efficacy against *chlorosis*, *anemy*, *neuralgy*, *neurosis*, *intermittent fevers*, rebellious to quinine, several *diseases of the skin*, in diathesis where predominated *lymphatism* and the abatement of the vital functions, such as the *scrofulus rachitism* and *tuberculosis*.

To day the physicians at Vals are not the only ones who consider the water of the spring *Dominique* as a good medical acquisition. Interesting experiments have been made by other practitioners, proving its divers proprieties. We shall, when speaking of the diseases of the skin, give several observations made in the hospital of Antiquaille, at Lyons.

Thus, the reputation of this spring every day makes us believe, and we are able to affirm that, notwithstanding its arsenic, or rather because of this medicinal agent, a third of the patients who come to Vals every year, come with a view of a treatment at the spring of *Dominique*; the greater part of the rest we still say, when they witness the fine and prompt results obtained by this salutary water, demand to be directed to the same spring.

The water of the spring *Dominique* should be used in neurostenical affections and *anemy* and *languishing* morbid states if they wish to test its curative power. We regret that the limit of our space will not permit us to present, as heretofore, some of our numerous observations on this subject.

CHAPTER III.

CHLOROSIS AND ANEMY. — NEVROSIS.

NEURALGY AND CACHEXY.

CHLOROSIS AND ANEMY.

Notwithstanding the identity of the descriptions made by most authors, and the several points in which they appear to be analogous in common symptoms, chlorosis and anemy are two morbid states which must not be confounded.

It is very rarely that chlorosis is found without phlegmasy, except amongst young females, and if the patient be exempt from organical lesions, is neither tuberculous or scrofulous, one finds only nervous phenomena in the digestive functions, circulatory and catamenial; the blood becomes impoverished, and contains less red globules; but, all the accidents appear to be produced under the influence of a perversion of the innervation.

When the affection relies on tuberculous diathesis, rachitical, scrofulous or chronic, it is nothing but epiphenœmon, and requires the same treatment as diathesis. Now, as the water of *Dominique* is applicable to the three first, we shall refer to them a little later.

When chlorosis exists in a simple state, the beauty of forms is kept, the more easily than the patient is very quickly cured by wisely employing bitters, ferruginous and sedatives of the nervous system. The water of *Dominique* answers still, to the divers indications that they seek to obtain by the employment of these medicinal agents.

ANEMY, on the contrary, attacks both sexes and all ages; it displays amongst the characters the most assailing, a general thinness and debility; the paleness or whiteness of the skin differs from that produced by chlorosis. Anemic state is accidentally produced by hemorrhagy or a pre-existent disease: abundant catamenial losses are often the cause and also the consequence; sometimes it is acquired from the influence of an ordinary deleterious

or insufficient diet; it borders on cachexy and a little time may lead to it. Finally if it be not preceded by accidental hemorrhagy, it is long in getting well.

The blood, in these two morbid states, becomes notably deglobulized; but there is often polymenorrhœa in the anemy, then it is red deep with some fibrine.

In chlorosis, if there be amenorrhœa or irregular apparition of menses, then the blood is pale. These observations are practically important, for although the iron becomes to both, one will very favorably aid its action in anemy, by associating it with a little spurred rye, this would be folly in chlorosis. The marriage state is often a sufficient cure in the last; but it is almost always grievous in anemy.

In conclusion, CHLOROSIS is a pathological entity, a primitive disease, characterized by the deglobulization of the blood and by the nervous phenomena which are attached to it. Its symptoms are perversion of the innervation, going sometimes to a particular state of the uterus, and extending to the stomach, which, by digestion leads to the rarefaction of the globules of the blood, its impoverishment and divers functional alterations.

ANEMY is always a pathological state consecutive to an apparent or imperceptible lesion. It is common with chlorosis only in the alteration of the innervation and the empoverishment of the blood.

The last is a disease; anemy is a symptom; cachexy in the anemy carried to its last period.

The constitutive and sedative proprieties of the water of the spring *Dominique* are a prompt and efficacious remedy for these morbid states. With anemy it renews the blood, giving a normal plasticity, supplies the too abundant losses, and disposes it to heal the tissues or apparatus, on which the lesions have produced the secondary disorders which constituted the anemy; often the water of the spring *Dominique* alone suffices to establish the health; but they may, if needful, assist it with a proper medication.

In the simple chlorosis the water of the spring *Dominique* has never need of aid.

It takes the whole nervous system, giving it tone and ease, and consequently causes all the morbid phenomena to disappear promptly, from the general innervation, which is the prominent

cause of the disease. to the functional alterations which are the consequence of it.

In the state of cachexy it gives results as happy as in other cases of functional disorders, as, for example, in the ultimate alterations which follow a palustre or herpetical diathesis. The following observations, show the salutary influence of the water of spring *Dominique* in chlorosis and anemy.

OBSERVATION ON CHLOROSIS.

Miss Lemp..., of Lyons, aged 19 years, of a nervous and lymphatical constitution, stout, and sick six months; she came to Vals on the 15th of August. The least exercise or shortest walk put her out of breath, made her heart beat with violence and complained of want of force and courage. Her pulse was constantly at 120, and the auscultation of her lungs might be heard at a considerable distance if they were in the least disturbed.

She still had her appetite, but she sought aliments acid or highly flavoured. She liked to smell odours that were not sweet, as a newly-printed news-paper, and to chew the grain of coffee. The menstruation is irregular and sometimes does not appear for two months. She felt a little abandoned, and given to melancholy. As in the true chlorosis, the skin was yellow and several blue veins might be seen.

The water from the spring *Dominique* was immediately given to her, one glass morning and night, then two, and finally six per day. The palpitation of the heart soon ceased, and her respiration became lengthened, in fact the forces returned. She also made long walks in the later part of her visits. This change was astonishing; her colour had returned; and after 24 days of treatment, she left not only in appearance but in reality, with her health re-established, and for eight months she has not found one symptom of what brought her to Vals.

To the characteristical accidents of chlorosis, are frequently joined dyspeptical troubles, owing as much to irritation of the digestive organs as to the general phenomena which entertain the disease, that is to say, to the perversion of innervation. For the first of these causes it is by soda and ferruginous waters of *Rigolette* and *Magdeleine* that we treat the chlorosis, as we have told in the first part of this work, and for the second it is by that of the spring *Dominique*.

OBSERVATION ON CHLOROSIS WITH DYSPEPSY.

On the 15th of July, Doctor Lassalle, of Villefranche (Rhône), sent us a female of 18 years of age, Miss Marie G...; she was troubled with heaviness in the epigastrium, sometimes with nausea, and in the morning with several rejections of glairy matter. Her tongue was white, her pulse at 90; her colour pale yellow, menstruation was regular, but a little abundant.

This chlorosis had already resisted strong preparations of bitters, anti-spasmodical and other active therapeutical agents; for the experienced physician of Villefranche had treated her with all the method and energy that he was capable of.

The water of the spring of *Dominique* had effect on the disease in 24 days ; the young female, timid as all chlorotics are, only came once or twice to give an account of the effect of her treatment ; but we had perceived it when at the spring and continued our prescription until her final cure. As the previous patient she has had no return.

The examples of similar successes are frequent at Vals. We give another in abridged detail.

Miss Julia M..., of Valreas (Vaucluse), a fine person of 18 years. Chlorosis was evinced in the neighbourhood of the heart, short-breathing, the feebleness of the legs, and amenorrhœa. They had not been able to cure her, notwithstanding the numerous medications administered, such as comfit of Gélis and Conté, syrup of Gille, digitalis quinquina, etc. When her stomach had somewhat become accustomed to the water of *Dominique*, we gave her six glasses a day, and after 14 days' treatment the state of chlorosis had completely disappeared.

Anæmy being a symptom brought on by various morbid troubles, and sometimes very serious, is, consequently, more common than chlorosis. If the alterations, to which it is connected, are not beyond the resources of art, they will easily be cured at Vals ; we quote the following as a proof.

OBSERVATION ON SIMPLE ANÆMY.

Miss A..., of Avignon, aged 15 years and a half, was a tall and fine person, well constituted, but of whom the menstruation furnished abundantly, for 7 or 8 days, a very fluid and dark coloured blood. She was feeble and had palpitation of heart ; her pulse was slight, but at 112 per minute.

The good care of Doctor Chauffard had diminished a little the palpitation ; he had employed digitalis, cod liver oil and several other martial preparations. The unhealthy state was still stationary, entertained probably by the frequent return of polymorrhœa. Doctor Chauffard became determined to send the patient to us, with a letter in which he wrote : " Miss M., has want of reconstitution in several ways, and it is for this that I have sent her to Vals.

Put under treatment the 21st of July (4, 5, and 6 glasses of the water of *Dominique* per day, and an alkaline bath every other day). The cure was so prompt that in less than 18 days she returned home, not pale and languishing as when, she came, but lively, active, and of a good colour, in a word she was well. Two months after, the practitioner himself told us that she continued so.

OBSERVATION ON ANÆMY WITH INTESTINAL VERTIGO, DYSPEPSY, AMENORRHŒA AND LEUCORRHŒA.

Doctor Pillet, of Lyons, sent us Mrs L..., on the 24th of June. She was 26 years old and had been married two years. Though there was no regularity, she had always been well, when 18 months after, the loss of an infant had altered her

health and appearance. The frequent supplementary epistaxis became suppressed and leucorrhœa and dyspepsy followed.

Her appetite was still good ; the first digestion was tolerable, but three hours after the meal appeared borborygmus, and flatulency in the intestinal vertigo.

She was very impressive. Her pulse first gave 120, then 100, then 80 strokes a minute, after a few instants. Full of agitation and fear without any cause, and she walked with difficulty without being fatigued.

Dr Pillet in his letter of recommendation said, "I am sure that the ancient reputation of the water of Vals will not fail to restore the losses of this patient." The experienced practitioner was not deceived. On the 14th of July after 21 days, treatment, Mrs L.... returned to Lyons in a very satisfactory state, having taken, in gradual ascension, 6 glasses a day of the water of the spring *Dominique*. Her digestion had been ameliorated and her forces restored. Leucorrhœa had disappeared, she had no more vain fears, nor vertigo.

If the patient had prolonged her sojourn at Vals for two seasons the water of *Dominique* would have cured the catamenial function, which from a vague recollection, had appeared once or twice in 15 years. The sanguine molimen sentiment, which she evinced in the belly during the last days of her treatment, gave us great hope.

OBSERVATION ON ANEMY WITH CARDIALGY.

The palpitations of heart under the nervous influence, without hypertrophy of this organ, having nevertheless, by their duration, produced anemy are often calmed by the water of the spring of *Dominique* (sedative and reconstitutive), and the anemy did not prevent its cure.

Mrs P... of Arbresle (Rhône), and aged 28 years, sent to Vals by a physician of Lyons, had that paleness which accompanies anemy amongst persons of whom the menses are too abundant, and on the least exercise she had palpitations ; she was also very feeble. Twenty days of treatment were sufficient to restore the general constitution and give a colour to the face ; the gums lost their paleness, and the beating of the heart ceased ; only, the pulse had still a little normal quickness, but several grains of digitalis soon put it in order.

With this patient, the palpitations of the heart were regular and not very strong ; there was no augmentation of the volume of this organ ; for, although arsenic maintains, in proper limits, the reconstitutive effects of the tonical agents of the water of the spring *Dominique* it is prudent not to advise its use in the organical diseases of the heart, when they fear to augment the sanguine congestions, as in hyperemy of the lungs that may be accompanied by hemorrhagy.

Amongst children, after chronical bronchitis, measles or hooping cough, and also amongst young females or adults, they often see anemic state accompanied by a little dry cough, rebellious to the ordinary means. From the numerous examples we have seen promptly cured at the spring *Dominique*, we recommend it to all, and its calming and tonical principles are such as may be depended upon.

NEVROSIS.

In the greater number of nervous disease, the blood is altered and the patient shows marked characters of chloro-anemy : besides the morbid accidents are often intermittent, from thence, it may easily be seen, as in chlorosis, the other nevro-pathical affections happily modified by the water of the spring *Dominique*, when they are not connected with several incurable alterations.

For the most part these patients seem to begin by an alteration of lessened, excited or perverted innervation. Almost always the functional troubles augment by the diet and bleeding, and as the authors of the *Compendium of practical medicine* say, if it be necessary to act on the nervous system, embarrassment of the therapist begins when he is obliged to make choice of the means of action.

Their uncertainty is not of long duration, if they remember that the water of the spring of *Dominique* acts on the nervous system by its arsenic, as on the blood by its tonical elements, and so, on the other part, it proves its truth, equally spoken of by MM. Monneret and Fleury : « The best means to cause the excitation of the nervous system to cease is to tonify all the system and in some way reconstitute the blood. The tonical and corroborant treatment, is that which succeeds the best in nevrosis, which affects the organs of the nutritious life ; it is also indicated, in the other vital relations such as hysterics hypochondrid and catalepsy. »

Choreus, for example, cedes to the employment of iron, and Mrrss Long and Millet (of Tours), Guersent and Aran, have cured it with little doses of arsenic, which here play the part of moderating the innervation, and is advantageous as replacing opium and antispasmodics. If we have not under our eyes a recent example of choreus cured very promptly by the water of *Dominique* we must nevertheless admit, as a logical consequence of its che-

mical composition, the happy influence of the ferro arsenical waters of Vals, in the treatment of this singular nevrosis.

We have seen it also, and these two facts have been related in the medical newspapers; 1. To stop the hysterical state unmodified; till there, by the use of other energetic means; 2. To delay, from one to sixteen days, the return of epileptic accesses.

NEURALGY.

The tonical preparations and principally the chalybeate, have an incontestable utility in the treatment of neuralgy, whenever the constitution is deteriorated, and when neuralgy is the manifestation of a chloro-anemical state, which is very frequent. Also, nothing is more natural than to see the sulpho-ferro-arsenical waters of Vals succeed in relieving and even curing the neuralgical pains continuous as well as periodical.

From the double action, relative and reconstitutive of the water, its successes are explained in the simple neuralgy, and from the anti-periodical property of the arsenic, it is equally successful when the disease offers the intermittent type.

This last kind, it is true, is rarely rebellious to sulphate of quinine, and the water of *Dominique* may be considered here, as one of those remedies of which we obtained good effects when the periodical neuropathy is complicated with anæmy.

Fowler, Pearson and more recently, Dr Boudin, insisted sufficiently on this clinical fact, admitted at present in ordinary practice; so it is unnecessary for us to proceed further, having already published several observations on this subject in the medical newspapers.

CACHEXY.

If even to the present day, there has not been given a good definition of the cachexitic state, it is still considered as the ultimate and deplorable period of the chronic affections. Now if this affection, at first local and restrained, extends in spite of the medicine administered by physicians, a most happy succour may be hoped for in the use of the water from the spring *Dominique*: and they will meet it surely, if the organs are not attacked with degeneracy.

and if the primitive morbid lesion will admit of the sulpho-ferro-arsenical waters of Vals or of one of its elements, arsenic, sulphur, phosphorus, etc.

The little hope that the word cachexy awakens in the mind does not permit us to dwell long on the subject. Nevertheless, the testimony of the honourable doctors Tourette and Chabanne, and the ancient physicians who have written on Vals, the history of the celebrated cure of the Dominican monk who has given the name to the spring, has given birth to the most precious legends of the country. Finally some facts we have witnessed ourselves, leave for us no doubt that they may obtain the most extraordinary effects, which in some instances could not be expected from the water of the spring *Dominique*. It is a remedy without danger, the patient drinks it with pleasure ; it must be given at first in small doses, and increased as the stomach tolerates it. But in short, the cachexic state being the last produce of one of the above mentioned diseases, it is impossible to stop there any longer without exposing ourselves to useless sayings.

CHAPTER IV.

INTERMITTENT FEVERS. — PALUDEAN INFECTION OBSTRUCTION OF THE MILTO.

Every one should have his due, says the old proverb. So to quina the first place, when there is intermittent fever. This would certainly lead the young physician into error sometimes dangerous, if he were to prescribe the water of *Dominique* as the best means chosen to withstand the access of fever. With regard to their anti-periodical proprieties, quina or the salts of quinine have given proof, and rarely failed to produce the effect wanted, if in proper condition.

Yet, and without leaning on what has been said by Torti and Nepple, amongst others, because there are few practitioners who have not ascertained it, *de visu*, there are accesses of fever, ceding easily to quinquina but which are reproduced very easily after several days. They see on the other part, the patient habituated and no more sensible to the effects of this medication, before the access be completely disappeared. When accesses are long in the return, sometimes attenuated or altered, quina is always incapable of vanquishing it; besides the vertigo, surdity and other accidents that it may provoke, when taken in a too strong dose, make the physician and the patient redoubt equally the use of it. It is to this resistance of the morbid element, indiscernible and unknown in its nature, what ever, has been said just to this day; it is to the disorders that it produces little by little, that will be successfully opposed the spring of *Dominique* and they see, thanks to the arsenic they contain, that it merits equally with *quinquina*, the little of anti-periodical medication. We can say also, from experience, that its tonical elements, make it an anti-cachectical remedy. Now this last curative propriety is very essential, because by duration, as is known in countries where they are endemical, the fevers of access have consecutive accidents, such as stoppage of the liver, milt or intestines, products ordinarily of the troubles of the digestion and circulation; then hydropsy more or less extended, a general cachexy and finally death.

Fowler, Pearson, Mr Boudin, and others have obtained prompt

and durable cures of periodical neuralgia and accesses of fever by employing arsenical liquors; the water of *Dominique*, is able to replace them with advantage, since it contains 3 milligrammes and one-tenth of arsenic per quart, besides it gives to the blood tonical mineral elements, which even render it more apt, than theirs, to contend happily against the state of marasm and hydropsy of which are affected the long-standing victims of palustral affections, and against cachexy in one word which is the consequence of the stoppage of the liver, milt or other viscera of the abdomen. The following are two examples of the power of the anti-periodical property of the water of the spring *Dominique*.

OBSERVATION. — THIRD INTERMITTENT FEVER.

M. D..., aged 26 years, was staying at Livron (Drôme) for a short time, to perform some commercial affairs. He had contracted at Sidi-bel-Abes, in a province of Africa, an intermittent fever of the tertian type, in the month of March preceding. On this occasion, he said, they made him take much quinine, and the fever had been stopped twice. It came again after two months, appeared to offer irregular accesses, every 2, 3, or 4 days with the three stages of shivering, heat and sourness.

Whether the liver and milt were more voluminous than in the normal, the patient was active and vigorous still. If he were not touched with anemy, he showed dyspeptical troubles; he felt that his forces had diminished. This commenced to abate his courage and he came to Vals on the 21st of the month of August, with a great desire to be cured. He took six glasses per day of the spring *Dominique* until the 30th, and eight to the 10th of September. Note here that persons attacked with intermittent fevers, take to the acid waters of Vals as the gouty or gravelous for the alkaline waters.

In three weeks he was completely cured of the febrile accesses, and the hepatic and splenic symptoms disappeared almost entirely. From the letters we had four months after, we were confirmed of the permanence of his health.

OBSERVATION. — IRREGULAR INTERMITTENT FEVER.

Henry Lagard, aged 36 years, an old soldier of the army of Africa, from three months since, had three of four different attacks. The third, was much characterized, shivering, heat and sweating, with a complication of vomiting vertigo, etc.

Each time that he was attacked with the fever, he became more difficult to heal, and even the last time (7 or 8 months since), at Boghard, near to Laghouat, being in an hospital, he had taken, said he, in 40 days, sulfate of quinine 30 times, without success. Accesses had become of an irregular form and appeared daily. Thus the Sunday preceding he had shivered much and vomited at two o'clock; Monday, vomiting and transpiration at 12; Tuesday, shivering, great dry heat, not

followed by sweating; on Wednesday, he presented himself for examination. It was the 1st of August.

This man, who appears to have a temperament lively and a constitution vigorous, commenced to become anemic. The painful and continued vomitings of a liquid matter which accompanied each access of fever, the fatigue of campaign, his prolonged sojourns in the hospitals has broken his natural energy.

The milt and the liver were swollen, the tongue white, the pulse at 75, no appetite and a bad digestion.

We commenced the treatment with 3 glasses of the water of the spring of *Dominique* each day, and got gradually to 4 night and morning. At the end of the first week, from the use of this water, the access had already disappeared; the treatment was continued for 25 days and led to a happy result, the febrile access was cured, the dyspeptical troubles ceased, and the milt and liver returned to their ordinary volume.

We have related in the newspapers of medicine a remarkable clinical fact, which we witnessed during the month of June 1866, Mr P..., of Marseille, had contracted in Morea, a quartan intermittent fever, which during 18 months had resisted several kinds of treatment, and had been modified only in the periodical manifestations. The access came every 18 days, and during 5 or 6, the patient was obliged to stay in bed, feeling shiverish, overwhelmed with heat and inexpressible agony. He came to our therms, and was subjected to the use of the water of *Dominique*, by one of our colleagues, who had the happiness of returning him perfectly cured, after 40 days of treatment.

If our space was not limited we could give observations on each kind of disease. But one more, an example of the intermittent fever, complicated with neuralgia of the milt. Dr Richoud of Marseille, sent to us a female, who became breathless when attempting to walk, she was anemic, of a bloated figure, the belly was swollen and the legs edematous. This female had almost reached a state of cachexy, the result of a painful stoppage of the milt. We saw these symptoms vanish in less than 15 days under the influence of the water of the spring of *Dominique*, nothing remained but a little oppression. When she parted for Marseille, she promised to continue the use of the arsenical water for two or three weeks.

How many times have our fellow physicians at Vals witnessed the success obtained by the water of the spring *Dominique*, in the treatment of intermittent fevers, rebellious to sulphate of quinine and having produced stoppages of the milt, sometimes even cachexy, albuminous urines, serious suffusions in the inferior membranes, or belly. How many times; have we not thought of our

soldiers in Africa, who are so frequently attacked by the palustrous infection? What a great benefit would be rendered to them if they were sent to our thermal stations, near to which they would find besides the alkaline waters, recommended by prof. Trousseau for the treatment of long standing paludean fevers, the water of the spring *Dominique*, so reconstituting and so eminently efficacious in morbid accidents affecting periodical forms.

CHAPTER V.

DISEASES OF THE SKIN (DERMATOSIS).

In the second chapter in describing the proprieties of arsenic, our aim has been to prepare the reader to draw a legitimate conclusion for himself, relative to the therapeutical employment that he may make of the water of the spring *Dominique* for the treatment of dermatosis, when it is the consequence of an affection itself susceptible of a happy modification by arsenical preparations.

From the commencement of this century, the English physicians have known the efficacy of the salts of arsenic in leprosy and other diseases of the skin in a dry form, and since then, this therapeutical agent has furnished to dermatologists of renown, the most remarkable cures. They know as well to-day, that the drinks of Felz and Arnault have owed their great success in herpetical affections, and consequently, the reputation they have acquired, to minute portions of arsenic, which the sulphur of arseniated antimony entering in their preparation gets dissolved in the water: this is what gives to these drinks a mineral element common to the water of the spring *Dominique*.

If, on the other part, they consider that several specially distinguished physicians, notably Mr Rayer (*Diseases of the skin*, t. I, p. 83), have pretended to heal ulcerated eczema, agrezated lichens and other cutaneous and grave affections, by giving to the patients sulphuric acid, from 1 to 4 grammes per day, greatly diluted by water, they will easily comprehend that the spring *Dominique*, perfectly representing the mineral lenonade of Mr Rayer, and containing, besides, the rudimental arsenic generally advised for a category of dermatosis, is able to fulfil the same office, that the sulphuric and arsenical preparations.

The fact is whatever may be their different modes of manifestation, a great number of these diseases of the skin seem to rely on a diathetical state, acquired or congenital, and derive their pre-existence from substances in the blood which are strange to the constitution. Even when the essence and the individuality of these alibile matters escape our means of investigation, analogy

permits us to believe that they belong, little or more, to the immense organical corpuscles which compose the mysterious items of our France. But, to resume, these substances, virus for the ones, product of chemical fermentation for the others, be they called by Mr Andral, animal rudiments, and by M.rousse Trousseau and Hildoux, epigenetical productions; these substances, say we, characterize a great number of morbid states which make the persons, having inveterate diseases of the skin, to say; that they have bad blood and humors; on their subject Dr Rayer has written, that they are a symptomatical expression of a pre-existent alteration in the organism.

Now sulphur and arsenic are two parasitocides, and besides, they are also very useful medicinal agents, powerful modifiers of the general and primitive affections of which dermatosis is but one manifestation. The water of the spring of *Dominique*, containing these two medical substances, will then be a very rational and energetic means to use against the diseases to which we have made allusion; they are certain to succeed if employed with care and method.

It is necessary at first to distinguish, what are the cases in which the water of the spring *Dominique* ought to be preferred, that is to say, those that require sulphur and arsenic and those that require alkaline remedies, and it is not difficult to establish this opinion. It will suffice by recalling what was said in the tenth chapter, 1st part, in speaking of the dermatosis that ought to be treated by soda waters; the locality of the lesion does not indicate what treatment ought to be adopted, but, it is the nature of the affection then that must guide us. If it be, for example, psoriasis or eczema, it requires treatment by the alkalines, if a general gouty or rheumatical affection has existed; but if it proves a state of scrofulus, herpeticus, or other diathesis tangible by arsenic or sulphur they must use the water from the spring of *Dominique*.

As to the method, it consists by employing in small doses, *Dominique* (a quart a day about), but for a long time (one to three months) as is practised in long diathetical medication, introducing very active substances in the economy; thus searching to withstand the morbid element through the humors even to the tissues. As long as the new clinical studies have not modified the opinions which at present exist on the diseases of the skin, it is necessary

to believe that, in the period of ague, these lesions are not justifiable of mineral waters. It seems to us however, that probably the water of the spring *Dominique* playing the sedative action of arsenic to the reconstituting proprieties of its other mineral agents, may make an exception to the rule.

We should like to relate here several observations given at Vals; but, though good number of persons attacked with diseases of the skin, come, they only remain 20 to 22 days, the greater part of whom have followed no definite regimen, thereby losing, or rather preventing the medication from obtaining an effective cure.

From this we had some uncertainty of the power of our spring of *Dominique*, last year, in the treatment of the diseases of the skin; but now, it has, happily disappeared, thanks to our fellow and friend Dr Bonnaric physician in chief of the hospital of Antiquaille, of Lyons where, for 20 years he has had under his notice all the forms of dermatosis.

The proprietors of the spring *Dominique* furnished the water necessary for the treatment of four patients, whom Mr Merle, observed with great care; the results of which we relate as given to us by Dr Bonnaric.

We regret to say, that for want of proper attention the water has sometimes been wanting, which made an interruption in the treatment; this, of course, lasted one month more, but happily it did not change the results.

Hospital of Antiquaille at Lyons.

FIRST OBSERVATION-LICHENOID ECZEMA.

Dorfin, married, and aged 36 years, she was a seamstress at Marchampt, of a lymphatical temperament, constitution was feeble, and she had no previous disease. Her father had had, all the course of his life, scurf on the legs.

She entered the hospital on the 4th of January, and was put in the Sté-Colette hall (n° 5). She had on her superior members, and on her neck and face, an eruption of which the character was scarcely distinguished; its long-standing however indicated eczema lichenoid. When asked as to her antecedent, this was her reply: the menstruation had been regular since 17, but she had often had white losses; married at 22, had three children who never had any disease of the skin. In 1860, she burnt her arm, and in about a month after, there appeared a large eruption, about the size of the palm of the hand, in the unhealthy part of her arm. This eruption soon spread to her neck and face. The patient attributed this apparition to the application of a piece of linen saturated with vert-di-gris and placed on the burn by way of cure.

Being treated at this time by baths of sulphur and the water of Uriage, the eruption completely disappeared a little after. But in a year after it reappeared towards the autumn, with less intensity, it is true, again disappearing at the end of several months without any treatment.

Since then, to the autumn of 1866, it irregularly returned, but lasted for a few weeks only. In 1866, towards the middle of the autumn a appeared a lichenoid eczema the duration and gravity of which brought her to the hospital.

The day after her entry, on the 5th of January she was treated by the water of *Dominique* spring (*intus* and *extra*), a glass night and morning ; application of compressed portions of this water on the affected parts ; drink of saponary ; on the 12th, was added to the prescription a spoonful of antiherpetical sirop, pomatum of the ioduret of sulphur ; the drink was changed to a depurative ; 29th suspension of the water of *Dominique*.

The state of the patient at this moment was very satisfactory, the eczema had under gone a sensible amelioration, the lichen very little modified, however the cure had begun.

Abstention of the water during 15 days. Retaken on the 10th of February, for 8 days about, new suspension until the 2nd of March the patient showed recrudescence in the affection when the water was abolished.

25th March, the state of the left arm was considerably ameliorated ; the skin on the right of the fore-arm is still hard and dry, and is the seat of an itching sufficient to demand an application out of the treatment.

The lichenoid eruption has still much diminished. The state of the face was very satisfactory. The water of Vals retaken (*intus* and *extra*). — The patient left the 12th of April completely cured ; the skin leaving no trace whatsoever.

SECOND OBSERVATION. — GENERAL PSORIASIS.

Musset, Benoit, aged 17 years, and living at Pouilly (Loire). She was a domestic, of a sanguine temperament, in good health ; entered the hospital on the 9th of November, 1866, under the care of Dr Bounaric, in the Ste-Colotte department.

When visited the day after her arrival, she showed psoriasis in all the body from the feet to the head. The scales were dry, except at the ankles and knees where they were about the size of a crown.

To the question put to her, she replied that she had been of good health, but 10 years since she had the typhoid fever for 30 days which left no traces. A year before a squamous eruption analogous to psoriasis, of which she was actually affected, had developed itself on the ankles, knees and the surface of the legs ; several discreet scales, a little more confluent to the level of the articulations, constituted all the disease. This had not been modified by the typhoid fever. The eruption was stationary until she was 16 years old, no treatment having been used. At this time rapid extension of the disease on the whole length of the members, treatment by salves of which she did not remember the composition, baths, cure incomplete, it still existed from the ankles to the knees, three or four months later, re-appearance with extension on the chest. At 16, $1\frac{1}{2}$, establishment of the menstruation, and under this influence, without treatment, complete disappearance of the psoriasis, but on the knees and ankles. This cure was not of duration, because at the end of 8 or 9 months a new eruption, more extended than the former, appeared. This brought her to the hospital to undergo a treatment. Note,

that the mensuration regular in the first 3 or 4 months of its appearance became very irregular during the 3 months that preceded the last eruption. The flow of the menstruation has been suspended for 2 months but had again returned ; it comes now every two months, now month, sometimes every fortnight. Such is the history of the patient.

On the 11th of november, two days after her entry in the hospital, they prescribed a depuratory ptisan with 0,25 c. of iodure of potassium, a globule of arsenic acid, a pill of the alkali or hemlockz and a salve made of the iodo-chloride of mercury 1/60. 29th november, suspension of the salve which had produced stomatitis. Astringent gargle ; purgation. The mercurial salve is replaced, the 5th december, by another composed camphire, tar and calomel.

This treatment was continued just to the end of december, when all was suspended. At this time there appeared to be an amelioration in the patient, the scales had waned every where, the squams had partly fallen, but the spots were still very visible, particularly at the ankles and kness, the primitive locality of the psoriasis.

From the 25th of December 1866, to the 5th of January no treatment.

5th of January, water of *Dominique*, one glass morning and night, application of compressed bathing by this water on the parts, the longer the better.

29th January, suspension in treatment want of water.

The amelioration of the patient under the influence of the treatment previous to the 5th of January, had made, by the means of the water of Vals, very visible progress ; a great number of psoriasical and gouty (*psoriasis guttata*) scales had disappeared, but still there were some to be found on the arms and legs, as well as the face and other parts of the body. She was not yet cured.

Abstention of the water 15 days. — Retaken for 8 days ; fresh suspension to the 2nd of March, then retaken.

On the 22th of March, the patient presented no traces of the primitive affection, but on the ankles. The knees were a little red. The rest of the body was entirely cured.

THIRD OBSERVATION, — LOCAL PSORIASIS.

Agathe Copin, of Saint-Étienne (Loire), aged 28 years, velvet-weaver, of a lymphatical temperament. — No disease of the skin in the family, only a brother had a white tumour on the knee.

She entered the hospital on the 20th of October 1866, in the hall of Sainte-Colette (n° 7). Been affected six years. of local psoriasis in the fore part of the leg. The patient primitively limited to the ankles and legs, extended successively, little by little, the salves used, of which she knew little of their nature, did not modify it in the least.

Married at 20, two confinements not having in the least changed the position of the dermatosis. She entered the hospital of Antiquaille by the advice of her parents, and was under the care of Bonnarie. On the 24th of October, she was submitted to the following treatment : depuratory ptisan, a globule of arseniate acid, salve of tar ; on the 12th of November they added 4 pills of the aloes of soap ; 26th they replaced the salve of tar by that of iodochloride of mercury. The 23th of December, suspended all the prescriptions. At this period the psoriasis is sensibly ameliorated, several scales had disappeared ; no treatment during a month. The 5th of February, water of *Dominique*, a glass night and morning, at the same time the parts that were bad were bathed also ; after a certain time they found the same result as in the case

n° 2, very sensible amelioration, disappearance of several spots, paleness restrained, but not completely well ; this may be attributed to want of water for 15 days, after which she had only retaken for 8. Finally at the end of these 8 days, the patient left the hospital in a state of health much ameliorated, but, as we have said, not completely.

FOURTH OBSERVATION. — LICHENOID ECZEMA ON THE ARMS, FEET AND BACK OF THE HANDS.

Maria Sarlie, of Selle-Barmontaire, aged 32 years, draper, of a lymphatical temperament, entered the 8th of October 1866, in the hall Saint-Philomene of the hospital (n° 1). She was affected with chronic eczema on the arms, feet and back of the hands ; constitution feeble, menstruation appeared at 14 years but very irregular ; since 15 she had leucorrhœa. About this time eczema appeared around the wrist. She had received no treatment since 1864. During this interval the eruption seemed, said the patient, to have become more extended and intense because of the irregularity of the menstruation.

She entered the Sainte-Marie hall of the Antiquaille hospital on the 15th of December 1864 ; after four months of an appropriate treatment, the eruption completely disappeared. Three months after the disease had gone, eczema reappeared ; new treatment, success incomplete. Towards the end of 1865, the disease extended to the feet. Treatment, salve of tar from a gratuitous consultation, took arsenic and sulphur. Persistence of the disease. Finally, in October 1866, Marie Sartie entered the hospital again and was submitted to the following treatment.

10th of October. — Depuratory plisan, — a spoonful of anti-herpetic sirup, — salve composed of magnesia, 1 gr., sulphur, 0,50, ointment of lemon and roses, q. s. — Sulphuric baths.

24th of October. — Purgation.

12th of January 1867. — Salve of widow Farnier.

Under the influence of the foregoing treatment, the disease was slightly ameliorated in the arms, but the feet were not in the least.

16th of January. — Suspension of the prescriptions. — Treatment by the water of *Dominique* (*intus* and *extra*), a glass night and morning, as well as a bathing of the sore parts.

29th of January. — Suspension of the treatment by want of water. At this time the eczema presented a considerable amelioration ; it had diminished one third of its original extent, and what was left was very materially modified ; the epidermis completely dry, scarcely any squames, it is slightly purple, neither painful nor prurient, it still requires several weeks of treatment to heal it.

As to the lichen, there were scarcely any traces on the arm, and had completely disappeared on the feet.

After a discontinuance for 15 days, the water was commenced on the 10th of February for about 8 days, then suspended till the 2nd of March, retaken again. The 25th March, the left foot was getting better, only a few lichenoid pimples, but the right one had subsided to a recrudescence. She was red and the eruption very confluent.

Under the influence of the water of *Dominique*, retaken the 2nd of March, we said (*intus* and *extra*), they found, on the 15th of April, the complete disappearance of all the cutaneous eruption, even from the leg to the arms ; and, on the 25th of April, the day of her departure, the cure was not in the least diminished.

These observations carry their teaching; but they would have given least satisfactory results that, nevertheless, one would be obliged to admit, that the necessary treatment of the diseases of the skin, which rely on constitutional, often hereditary, affections by an anti-diathetical and reconstitutive remedy, is the most rational as well as the only one to destroy the evil in the tissues, without chasing it on the organ; it is able to prevent the cruel metastasis, which, in a few weeks, change dermatosis, in phthisy deafness or amaurose.

As to syphilis, the water of *Dominique* has not yet been thoroughly tested and requires, further observation and experience. At Lyons we have seen a female cured of syphilitic eczema in 50 days; observation published in the *Gazette des Hôpitaux*; but we have not been so successful at Vals, with a young man sent to our thermes by Doctor Donnedieu, of Aigue-Vives (Hérault). This patient, it is true, was much fatigued by the long courses in the sun, and he parted at the end of 18 days, when the syphilitic spots commenced to pale.

It is to believe that we should have obtained more successes by a less limited treatment, favoured by more moderation in the walks and regime, because the *Escholiaste Med*, journal of Lisbonne, reported last year a case of two soldiers attacked with syphilis, having resisted the mercurial and iodure of potassium agents, who were cured by arsenic given in small doses. The waters of the spring *Dominique* may then be tried when other means are unsuccessful.

The treatment of a mixture of diseases of the skin, by the ferro-arsenical waters of *Dominique*, as a ptisan, and the alkaline baths, appears to us to reduce promptly several formes of exanthème. Here is an example.

OBSERVATION ON PRURIGO.

Baptist C..., of St-Pierre near Langogne (Lozère), aged 36 years, has always had good health, except for three or four months, when he was attacked by herpetical disease. On the posterior thighs, etc., appeared little agglomerated blisters, surmounted with a sanguine crout characteristic of prurigo. The skin was of a brown colour, but it was remarked in this disease, which had existed some time, because cutaneous hyperæsthesy is visible with him; and he was tormented with a continual itching, particularly at night: this is the ordinary accompaniment of *prurigo formicans*. This patient passed his whole time, he said, in scratching and irritating his skin; he was not able to sleep or to work for it.

There were no symptoms of rheumatism or gout to be found, nothing showed any diathetical affection but that of the herpes. It was evident that arsenic was the only remedy and the water of *Dominique* was given (3 glasses night and morning), besides an alkaline bath each day.

Under the influence of this treatment the itching soon ceased, the blisters bursted and died, and, at the end of three weeks, this ordinarily rebellious form of dermatosis had completely disappeared.

CHAPTER VI.

RACHITIS, SCROFULA AND TUBERCULOSITY.

Whatever be the primitive cause of these affections, or whether they are developed under an hereditary influence, they are always effective in altering and reducing the nutrition; from the predominance of the lymphathical system and of hypertrophy in the scrofula; by the production of material morbid elements in the tuberculosis; and finally by the softening, swelling and deviation of the bones in the rachitis.

When the disease is transmitted hereditarily, the pathological phenomena often remain for a long time in a latent state; but they become visible more quickly when the subject is rendered unfavourably and depressively hygienical, as from insufficient or bad nourishment, a cold and humid habitation, want of warm clothing, want of sun or even of light, so prejudicial on human organization.

It is known that by guarding against these inefficiencies, the morbid symptoms are retarded or their evolution suspended, even, sometimes, at the moment when they have already acquired a certain gravity, and by so doing some people have prolonged their existence for a time incredible.

All the physicians, as well as ourselves, have seen persons languishing, and from appearances, nearly falling into a state of consumption, rescued by warm climates under a pure atmosphere, their forces renewed, their health established, and restored to good hygienical conditions.

In 1842, we attended a young man at Rillieux, he was scarcely 22 years old, and was affected with multiplied and suppurative scrofulous adenity. No remedy had been successful, and we persuaded him to sell his goods and go to Africa. There he dealt in toys, followed the army and became exposed to the rays of a burning sun in the day and at night slept under the brilliant stars, covered by a blanket only. We had forgotten him, when in 1859, we were accosted in a street in Lyons by a vigorous man, whom we recognised with difficulty, and who thanked us

very heartily for the counsel we had given him, because he had found in Africa not only health but a fortune.

But all patients are not able to go to Africa or take advantages of long walks in the sunshine, and it is for this that we are happy to be able to offer them a remedy which in a certain degree can hold the morbid predisposition in check, restore heat and vitality to the blood, ease the suffering, unconscious but real, felt by the patients, and suspend for an indefinite time the menacing disorders of diathesis, scrofula, rachitis and tuberculosis.

The water of the spring of *Dominique* appears to us to be susceptible of being this agent of reconstitution; by its tonical elements, notably the phosphate of iron and sulphuric acid, and arsenical rudiment it tends to heal the isolated and obscure diseases, and the different nervous disorders which accompany and accelerate the march of the disorganization of the tissues.

The phenomenon of the arsenic, according to Prof. Heitz, is constant physical amelioration and, according to Prof. Trousseau it suspends the progress of the phthisis and constitutes the best means of opposing the granulous angina. We have already said that it is from the one milligramme of arsenic per quart, contained in the mineral water of Mont-Dore, that are attributed the cure of the patients possessing a very bad cold, therapeutical results that we have witnessed ourselves produced at Vals, from the influence of a treatment by the water of the spring *Dominique*. Not only have we obtained anemical cures, dry or of a bad nature, but we have seen the scrofulous predisposition undergo a complete metamorphosis and the grave symptoms of adenity, even suppurating, disappear, giving place to a rich sanguification and a flourishing health.

In rachitism, the sulpho-ferro-arsenical water of Vals has effected several cures, and has shown to us in an evident manner the prompt effects of its reconstitutive power. We related an observation, in the *Gazette des Hôpitaux* (20th march 1866), and in this observation, not only a chloro-anemy, engrafted in a rachitical subject, has disappeared by 40 days, treatment of the water of *Dominique*; but the incurvation of the spinal column, as that of the young patient we have spoken of, did not look a rachitical digthesis, but an accidental cause.

In this kind of disease the arsenic facilitates and ameliorates the digestion, but that which explains the happy effects of our me-

dication, is the presence of phosphate of iron and sulphuric acid in the water of *Dominique* ; because it carries to the nutrition of the bones their indispensable materials.

Scrofula appears the most often from the age of 5 to 15 years, and it always manifests its first symptoms in the spring, as if, of all the depressive causes, cold and humidity were the most effective in producing it ; is is, however, one of those affections of which a happy modification is hopeful, if by appropriate means, wisely and perseveringly employed, the patient escapes those pathogenical conditions of strumous accidents.

We do not speak here of the symptoms and periods of the scrofula, but of the therapeutic which seems to us to be of the first rank in reconstituting the patient, because, besides the lymphatism which appears to have a major influence on the development of this complex morbid state, the affection introduces itself in the organisation depression of the forces and trouble of all the functions.

Amongst the different means of treatment, as much medical as hygenical, that which the experience of time and good practice has taught, is that the water of *Dominique* is one of those which should not be forgotten. By the arsenic it sustains and ameliorates the digestive action, maintaining the forces and the body ; by its reconstituants (sulphur, phosphorus and iron) it restores to the blood and to the tissues the vitality, necessary to reformation and cure, furnishing at the same time the most precious nutritive material.

But we must not forget that the treatment is anti-diathetical, and consequently ought to be followed a long time. The water of *Dominique*, in fact, does not act in the scrofula as in cases of intermittent fever or chlorosis ; whence it follows that in this diathesis as for rachitism, tuberculosis and dermatosis, above all, it is water transported, that should be used the oftenest.

Nevertheless, if they are not able to obtain a complete cure by a treatment of 25 days, the time generally given to a thermal essay, certainly there is good advantage to begin or to finish it near the beneficent stream ; because, thanks to the influence of the healthy climate and always pure air, the amelioration quickly increases, the remedy seems to act better, and the favourable impression made by the reconstitution of the organism, lasts for a

long time after the treatment has ceased, and even this may be continued by transporting the waters.

The flavour of the spring of *Dominique* though slightly acid and atramentary, does not displease the patients : many even say that it is agreeable with wine, during the hottest part of summer and when the oil of fish is scarcely fit to take, the repugnance making them inefficacious. Without doubt it is not necessary to recoil from the odora and almost intolerable flavour of a medicine ; but it is yet permitted, and even thought better, when they prefer another with a more supportable taste and joined to therapeutical proprieties more or less certain.

TUBERCULOSIS. — We have said before that we have seen a very bad cold cede to the use of the arsenical water of *Dominique*, as well as to a thermal treatment by the water of Mont-Dore. Evidently in one case as in the other, it does not act on the diathesis of the second, still less of the third degree : because in these two last process of disease, it is useless to apply to the physicians. It is not Auvergne or on the montains of Ardeche, that they will find the means of suspending, though even for a time very short, the effects of a tuberculous diathesis, already in a prodromical phase.

Accordingly it is the first that we would speak about, when, we know, that, the water of the spring *Dominique* is a precious auxiliary in the treatment of this terrible affection which at present occupies our attention.

Though for a long time, they have recognized to all the temperaments the sad privilege of furnishing the victims to this too common disease, the lymphathical temperament apanage of the weak and sickly constitutions is that which offers the most examples. The anemic state has been considered as the individual condition which presents the most chances of forming and developing the accidental product, called tuberculous, if the subject be surrounded with unfavorable hygienical circumstances.

Under the pathogenical point of view of this affection, they have gone far and have shown that, even without original diathetical predisposition, the organism may be influenced by modifiers, whether internal or external, so that to change, almost at will, the vital mode of an animal : and if, on one part, they considerably fortify the constitution by proper care, on the other, they may,

with the greatest facility, as practised on dogs by Mr Coster, breed anemy first, then soon after tuberculous diathesis. This is what permitted Dr Perroud (of Lyons), to say that the inheritance is not the only cause of tuberculosis, and that an individual may, under the influence of divers modifying agents, see infected by this diathetical vice the vital patrimony that he has received from his ascendants.

If then, by favorable or unfavorable treatment they may either improve or debilitate the constitution, if by the alteration of the digestive functions, they may render habitual the default of assimilation, considered by most authors, as a powerful cause of the impoverishment of the blood, of the lymphathical predominance, and in the last analysis, of the tuberculous diathesis; the forced conclusion arrived at then is: that the therapeutic of the phthisis to the first degree, independently of the pharmaceutical resources, equally useful in other points of view, ought to have principally for its aim, withstanding the anemy and the general functional languishing, which precedes and accompanies the development of the tubercles.

From this last point of view is it not logic to consider the water of the spring *Dominique* as one of the best auxiliaries to the treatment of the phthisis, before the phenomena of local inflammation, suppuration and consumption, be too far gone.

Its success is undoubful not only in the affections in which it is necessary but in others, it calms the overexcited nervous irritability, renders the digestion more complete, and establishes the equilibrium between the lymphathical system, already predominating, and the sanguine system, depressed and impoverished. The following fact is one of the numerous chronical colds that come every year to Vals, and which ceded to the sedative and reconstitutive proprieties of the water of the spring *Dominique*.

OBSERVATION. — CAPILLARY CHRONICAL BRONCHITIS.

Mrs M..., of Orange (Vaucluse), was sent to Vals by Doctor Millet (Gonzague); she was very thin and anemy was manifest. During two or three years she was very assiduously occupied with important business: this is what commenced to affect her health. She had recently lost a sister, who had died from disease of the chest, and an infant which had affected her still more.

From these causes united with a cold which had been neglected, she was prevented from continuing her work. She now felt a permanent pain in the chest; be-

low the breast, the dolour was accompanied by a little dry cough and a little oppression, which augmented on walking. The pulse was at 90; the menstruation regular, of a lively red, but a little abundant. The tongue was white, the digestion slow.

On her arrival at Vals, on the 21 June, a bath was given which appeared to aggravate the symptoms. The 26, she consulted us for the first time. The chest presented a little matity at the base; the auscultation made a hissing rattle in the high part of the right lung. Towards the summit of the left lung the respiration was normal, every where else was a little obscured. The oppression was very marked and the cough drew a little mucous globule, several had been slightly tainted with blood.

The water of the spring *Dominique* was given to a dose of about 3 glasses night and morning, was well tolerated; 1st of July the water was increased to 5 glasses a day, then to 6 to the end of the treatment, that is to say the 15th of July.

The amelioration was now considerable, the dyspeptical phenomena and oppression had ceased, the cough only appeared a little in the morning, and the auscultation showed the chest to be in a better condition for holding the air.

Two months after, we learned with pleasure from Doctor Millet himself the state of the patient was satisfactory.

Tuberculosis and scrofula often accompany each other, and the same treatment, which is favorable for each when isolated, is applicable when they are united in the patient. The following example, given to us by Doctor Berne, of Lyons, furnishes us with a proof.

OBSERVATION. — SCROFULA TUBERCULOSIS.

J. B..., aged 12 years; he has had weakness from his birth, his mother herself had bad health and frequently a cough. As he easily caught cold, he had not been sent to school until late and he was often obliged to be absent because of sickness. He had had several swollen glands around the neck, and one of them having burst had left a large mark on the right cheek.

Doctor Berne had several times tried to reconstitute this young boy and to cure the little chronic, dry and quintous cough. He had administered successively protoiodure of iron, cod liver oil, quinquina, the water of Bondonneau, etc., without success. He finally sent him to Vals, on the 10th of July.

The auscultation presented a little obscurity in the respiration, at the top of the lungs above all. The cervical and under-jaw glands had already considerably diminished by the rational and energetic treatment employed by Doctor Berne; they were still a little tumefied, and the cough might now and then be heard, particularly in the morning.

Submitted to use of the water of *Dominique*, three half-glasses, night and morning, and a little later 12 half-glasses a day; little by little his general state became ameliorated, the hoarseness disappeared as well as the cough. On the 30th, his health appeared reestablished, but an epiphenomenon appeared, which we have witnessed at Vals amongst patient treated by our arsenic water, and which has been signalized by Doctor Daffin also: that is to say there was a redness and a prickling in the eyes. The use of the water was continued till the 5th of August, the day the child departed. He has continued in good condition.

He became stout, his respiration large; he coughed no more and the glands of the

neck did not appear. He has not been attacked in fresh places by ulcers, and the cold of winter has not been able to overthrow the good effects obtained by the water of the spring *Dominique*.

After the exposition that we have attempted to give of the curative proprieties of the water of the spring *Dominique*, it will be seen that they have four important indications in the art of healing; they are at once *sedative, anti-diathetical, reconstitutive* and anti-periodical. This water, say we, taken at the spring or transported, is able to be of the greatest service to patients; when their therapeutical effects are better known and better appreciated, they will be equally accepted amongst physicians, as a precious resource, and as a very advantageous remedy to be administered in morbid circumstances which claim at the same time the employment of quina, iron, iodures, arsenic, the oils of fish and other substances, which, taken separately, fulfill one or two indications, but not four as in the water of the spring *Dominique*.

They find every where in dispensaries, those kinds of minerals which are contained in the composition of the sulpho-ferro-arsenical waters of Vals, but, they do not find the same procedure of mixing and combining them in the proportions necessary for the cure of the patients as nature gives. It is this that made Mr Gabler, the learned and judicious observer from whom we have quoted several times with pleasure, say: "The mineral waters in which the first acts are naturally attenuated, are, from their harmlessness and the surety of their action, most precious therapeutical agents."

As to what concerns the water of the spring *Dominique* in particular, do we not find there, as constituting part the phosphorus of which the utility in medicine is brought to light by the wonders given by pathology showing that: in all the diseases accompanied by considerable meagreness, always, when the organical acts are morbidly weakened, there is a diminution of the phosphorus; that is constants character of the scrofulous, tuberculous, and other cachexies. We add, that, combined with iron, phosphorus becomes in this mineral water a powerful assimilating agent.

We are almost able to say the same of the sulphur; and as to the arsenic which is part of the acid waters of Vals also, that

we may not repeat what has already been said, we will quote what Dr Perroud, of Lyons, has written with reason and clearness in his fine work on *tuberculose* page 167; “ With the different stomachal stimulants may be placed arsenic, the action of which on the nutrition is so manifest and so important. The daily use of this medication will produce very happy effects on the digestive actions of debilitated persons, amongst whom the general atony entertains an habitual dyspeptical state. They may then give with success every day to these patients one milligramme of arseniate acid, as advises Mr Germain, of Château-Thierry, or one or two drops of the liquor of Fowler, as Mr Bourguignon wished. ”

We will add but one remark to these appreciations of Dr Perroud: that is, that a glass and a half of the water of the spring *Dominique* contains the equivalent of the proportion of arsenical acid, advised by M^{rs} Germain and Bourguignon, and, that they may, by the employment of this mineral water, not only facilitate the digestive functions, augment the amplitude of the respiration, but still by its tonical and nutritive elements, by its chalybeate, phosphorous principles, activate advantageously the movement of the reconstitution to attain the desired results, more quickly and surely, than by giving the arsenic alone.

At the same time in all kinds of medication possible, the duration of the treatment by the water of *la Dominique* is varied according to the nature or the intensity of the morbid state: so in chlorosis, simple anæmy, and intermittent fevers, it suffices to consume it for 20 or 25 days; it is not the same in diathetical affections, when it must play the part of an altering remedy.

It is here that we may remember what Mr Gubler said of this last order of remedies, “ the alterants are not extemporaneous agents, but modifiers of a long duration, almost permanent, which, diathetical medicants, act by substituting themselves to other elements in the body. » To fulfil such an indication, it will be given from two to six glasses a day, following the tolerance of the subject and the gravity of the disease, but during one, two or three months and sometimes even longer.

Then the water transported will be the most often used in diathetical or constitutional diseases, and, as to the treatment at the spring, experience has taught us that the best mode of employing

It is to take it pure; but if they wish to sweeten it slightly, you may add sirup of honey or glucose in preference to ordinary sugar, on account of their easy decomposition.

As to all waters whatever they may be, mineral or not, the same abuse as they make of that of the spring *Dominique*, produces indigestion followed by diarrhæa; this is what makes us suspend the treatment, and we repeat it with a design. It is the prudent to commence by a small dose and gradually increase, 2 or 3 glasses a day, a dose which may be rapidly brought to 6 or even 8 glasses, if tolerance is established without trouble. One portion of this quantity, may be used at a repast, or mixed with wine, and the remainder at night and morning. Finally to complete the list of precautions to observe, it is necessary to avoid, we add, to take one glass before the other is absorbed, that is to say, there must be an interval of 25 to 30 minutes between each glass, according to the susceptibility of the stomach and the quantity taken.

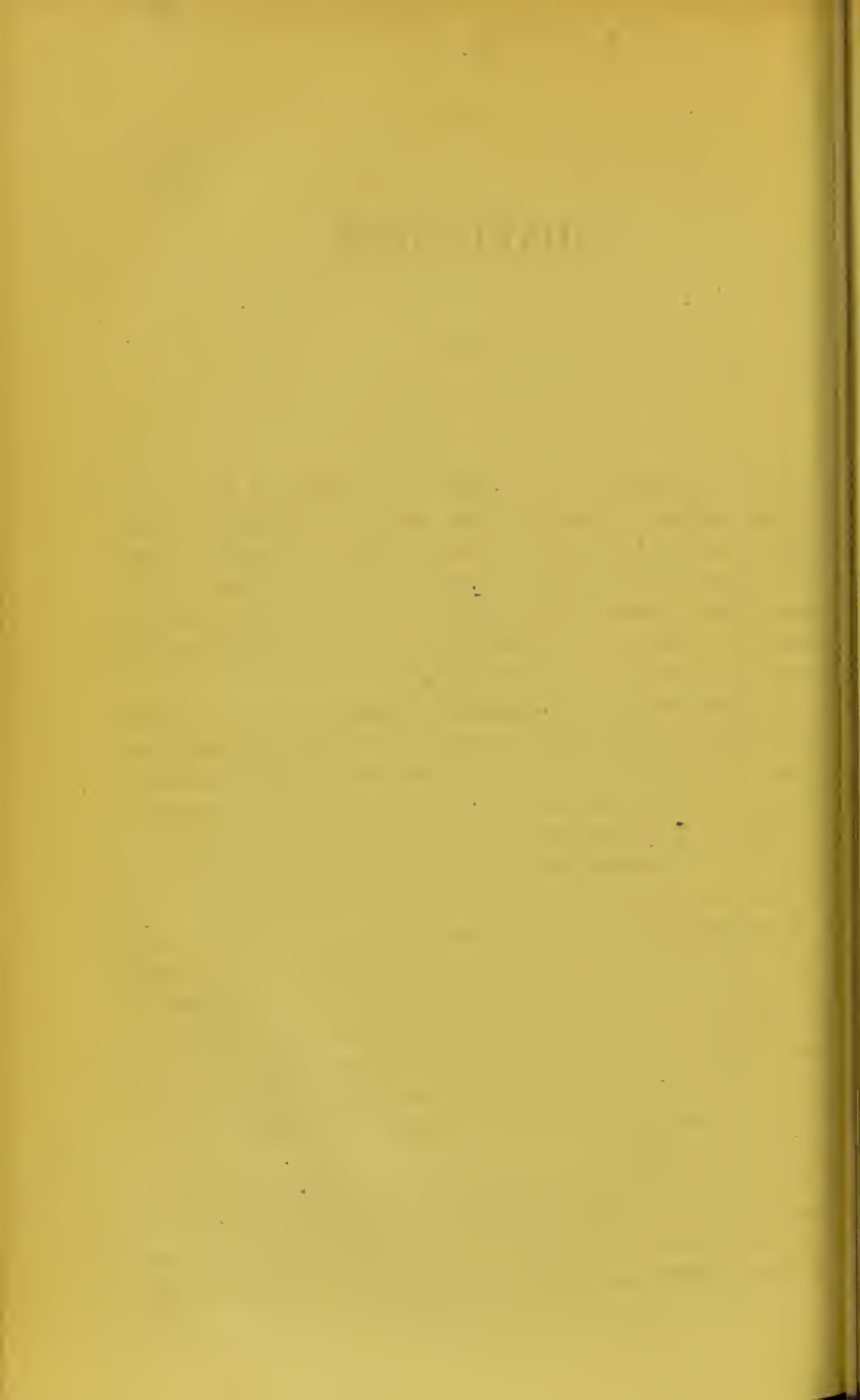
As said Vincent Raulin, the water of the spring *Dominique* is always a therapeutical agent *very efficacious in intermittent fevers* and in other accidental morbid periods. Since this physician it has given proof in chlorosis, anæmia and several other nervous diseases. It has often been of an incontestable utility in *dermatosis* not depending on the arthritis and in the scrofulous diathesis, also in rachitis and tuberculosis. Even in the *cachexies* of a long duration from the divers lesions, the physicians of Vals, by the means of this salutary water, have often, against hope, prolonged the life of patients for several years.

The water of the spring *Dominique*, which has been ably and clinically judged, by the account we have just made, is, no doubt, a complex, energetic medication, and this alone is sufficient to establish the fame of a mineral station. Does it contain other medicinal virtues? it is what the future will learn, because, in many countries already, it is the object of serious clinical study, and we have all hope that its history, which commenced from the time it relieved the pious Dominican monk, who gave to it its name, will be enriched by many new practical observations, all in behalf of humanity.

We will finish this study by the same observation that we commenced with.

When a mineral water can be preserved for a long time, notwithstanding its transports to long distance, physicians and patients have a right to use it at some distance from the spring and receive the good results as if they drank it at the station itself.

Experience, which has a thousand times been shown, leaves no doubt on the unalterability of the springs *Désirée, Magdeleine, Précieuse, Rigolette, and Dominique.*



CONCLUSION

This book, kind of *Vade mecum* of the waters of Vals, is a modest selection submitted to the benevolent attention of the reader ; and there we have tried to remind to the physicians the hydrotherapic and mineral proprieties of our thermal station. We have given, to prove what we have said, several clinical observations of physiological modifications that the fixed principles of our waters determine on the organism.

The most, not to say the unanimity of authors who have been or are yet occupied in medical hydrology have seemed to us incline towards this opinion, viz : that the therapeutical effects of a naturally mineralized water are modified with regard to the affections to which it is opposed, that is to say that its effects are different if chlorosis or nevralgy are to be opposed, and that it acts in a various manner in the gout and in the catarrh of the bladder..

Notwithstanding its numerous adherents, we do not think that this opinion ought to be accepted unreservedly, because in our mind, it does not explain truly what happens in the economy of the patient. We do not believe that Mr Patissier would write to day, that any modifying agent acts in preference on the diseased organ, and celebrated Bordeu, would not probably abuse the metaphor and say, that the mineral waters (these of the Pyreneas) *knock at every door*.

As any other medicament, every natural medicinal water is endowed with a *special* action which cannot be bent to the will or to the wants of the patient. This action is invariable for every sickness, and the same simple or complex influence is always per-

formed in the whole of the organs of which the functions are rectified. The consecutive result of this fact is to ease the other functions which depend from the first.

If an electric battery is charged, if the steam is condensed in the boiler, if the spring of a clock is strained the movement will be communicated to the most accessory wheels, and even to the most distant of the point where the force and motive cause are generated.

Such has been our theme. We have tried to prove that the mineral waters, these of Vals above all, will not carry the cure from organ to organ; but their part is greater, more fertile, we were going to say nobler; it revives the strength of the great spring of life, the nervous system; it restores to their normal state the main and conjointly liable acts of the organism, the digestion, the generation of the blood, and the secretions, if the tissues are not too deeply injured.

From this moment, the injured organ receives a part of nervous influx; it recovers, but it is not because the mineral water favors every part and has a different action in various lesions of organs.

As for the elective actions, they derive from the intervention of substances different of those which produce a special or general action. If magnesia or iron is added to carbo-soda water, it becomes laxative or greatly reconstitutive.

We will say once more, that the action is modified by the mineral substances, but not by the diseases. As the reaper cuts down what he has before him, the mineral water goes straight and without intelligence to its purpose: to revive the great functions. From that local cures ensue.

We have admitted for gaseous alkaline waters: 1° an action which stimulates nervous system and consequently ameliorates nutrition, respiration and circulation, activates the organs of secretion and the function of the skin. This *special action* has but a variable intensity in every one of our alkaline water springs.

2° We have admitted in second time *elective actions* which are the result of principles different from bi-carbonate of soda and carbonic acid, but which produce also a great difference of proportion in these common elements. We have therefore divided, as regard to their different influence on economy, the carbo-soda waters of Vals in three categories.

1st. TONICAL RECONSTITUTIVE WATERS, very mineralized and containing stimulant and strengthening elements. The standards are *Rigolette* and *Magdeleine*.

2nd. LAXATIVE WATERS which contain magnesia; by their purgative effect they act in a manner quite different; they flow from *Désirée* and *Précieuse* springs.

3rd. Finally, the TEMPERATE SEDATIVE WATERS, of which *Saint-Jean* spring is the standard (for it contains particles of arsenic), form the third category and are distinguished for their slight mineralisation.

We have perhaps said more than it has been done till now, of the influence of our alkaline gaseous waters in their therapeutical effects modified by carbonic acid. It acts on innervation till the end of the thermal cure as an electric stream, and we have given the true reason of hopeless cures we have seen performed at Vals in a few days by the use of alkaline gaseous waters.

We have tried to establish order between the direct and the consecutive effects, and we have proved that their medical substances once taken do not only affect the organs they are put in contact with, but that their first effect was to act against the origin of the most of chronical diseases, atonical alterations of nervous centres or of their ramifications. To establish this important fact we have proved that, by the use of our alkaline waters, general innervation is revived, digestion get better, the blood, in its turn, is greatly improved. The blood ought to be considered as moderator of nerves, in that sense only, for it provokes, on the contrary, aberrations and excites disorders, when poor or vitiated.

Finally, we have said that if the nerves are excited to work in the manner of a voltaic battery, represented in our waters by carbonic acid, the waters revive and give a new strength to the muscular system, and it is the first thing for the physiologist physician, the beginning of the cure.

This explanation of the effect of the alkaline gaseous waters, enlarges yet the field, so vast, of nosology, that our honourable fellow physicians have assigned to the therapeutics of the carbosoda waters of Vals, and it allows induction to foresee what may be hoped or obtained in the treatment of nevropathy, origin of so many other diseases.

We can hereby understand how the most chronical affections

are healed by our waters in their local manifestations, being at first eased in their origin. These different effects have given to the waters of Vals examples of prompt and hopeless cures, and if it, may be said, have performed the sudden resurrection of vital and organical forces.

As for the water of *Dominique* spring, its *reconstitutive antiperiodical* proprieties discovered, three centuries ago, by the celebrated cure of the Dominican, have been since this period very often experienced, and are known to-day by every physician. We have spoken of its tonical effects, but we have particularly insisted on its *alterating* and *sedative* proprieties generated by the presence of arseniate of iron.

To act as an alterating agent is a most precious quality and the sulpho ferro-arsenical waters of Vals will be the more used, that dermatosis and diseases produced by the presence of microscopical infusaria or other anormal substances in the blood and the tissues will be better known, it is to say, when the means of investigation will be improved, and will better answer to the curiosity of the young, ardent, and laborious men who will follow us.

If our task is not sufficiently completed, if the reader has met with numerous omissions and *desiderata*, he will remember that we have worked at the theory which will lead a day to the true theory of the therapeutical effects of our mineral waters; this discovery is reserved to others more skillful or happier, and this modest essay is not begun by Horatio's quotation :

Exegi monumentum aere perennius.

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